



**US Army Corps  
of Engineers**  
Waterways Experiment  
Station

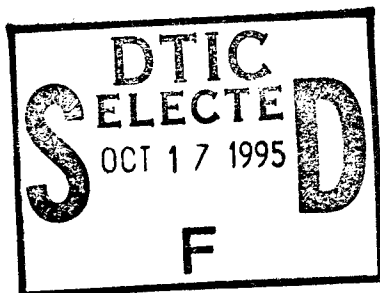
Contract Report CERC-95-1  
August 1995

2

*Field Wave Gaging Program*

## **Field Wave Gaging Program Wave Data User's Needs Survey**

*by Neptune Sciences, Inc.*



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**DTIC QUALITY INSPECTED 8**

Prepared for Headquarters, U.S. Army Corps of Engineers

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# Field Wave Gaging Program Wave Data User's Needs Survey

by Neptune Sciences, Inc.  
150 Cleveland Avenue  
Slidell, LA 70458  
and 11341 Sunset Hills Road  
Reston, VA 22090

Final report

Approved for public release; distribution is unlimited

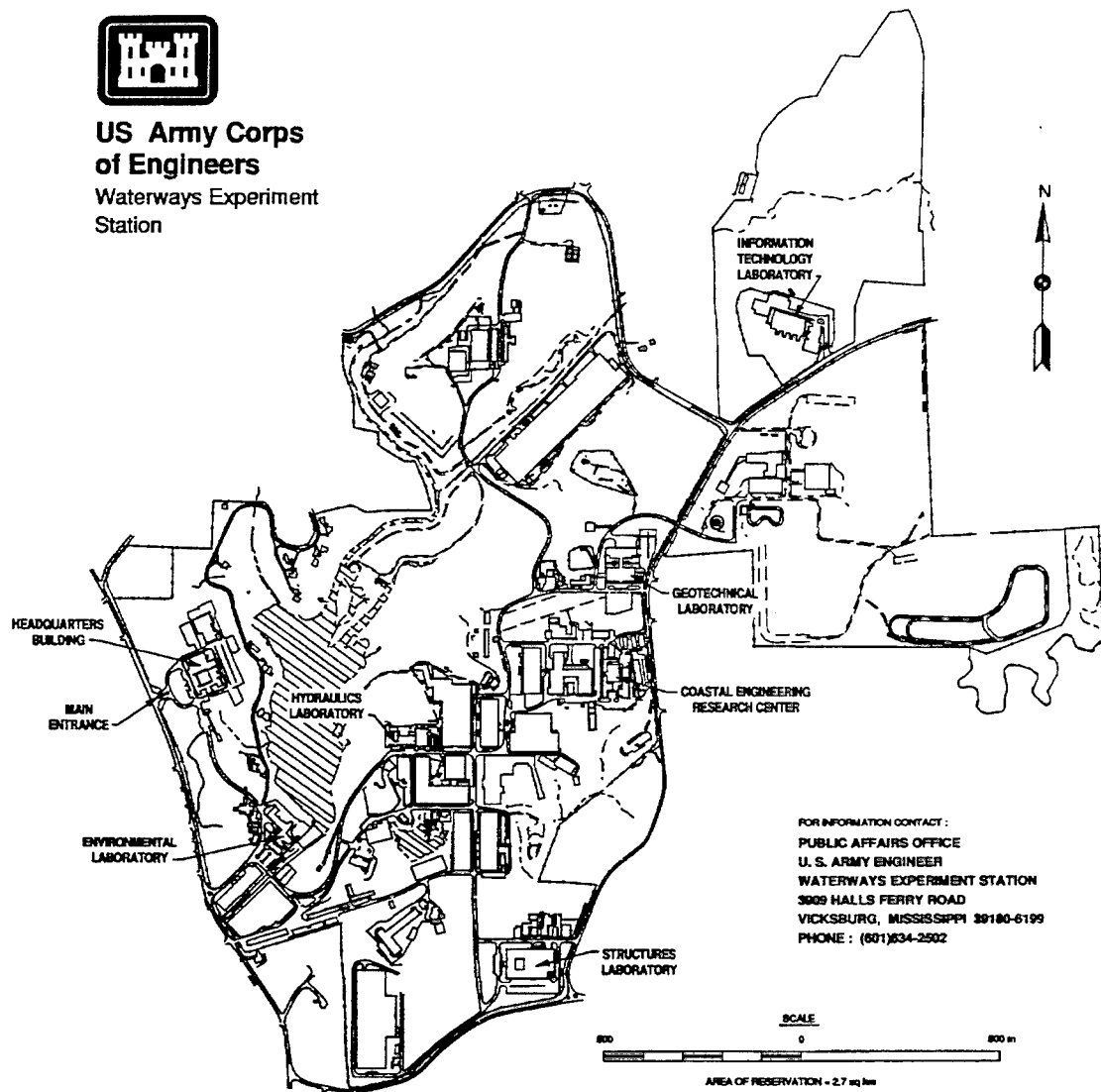
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Prepared for U.S. Army Corps of Engineers  
Washington, DC 20314-1000

Monitored by U.S. Army Engineer Waterways Experiment Station  
3909 Halls Ferry Road  
Vicksburg, MS 39180-6199



**US Army Corps  
of Engineers**  
Waterways Experiment  
Station



**Waterways Experiment Station Cataloging-in-Publication Data**

Field Wave Gaging Program wave data user's needs survey / by  
Neptune Sciences, Inc. ; prepared for U.S. Army Corps of Engineers ;  
monitored by U.S. Army Engineer Waterways Experiment Station.  
196 p. : ill. ; 28 cm. — (Contract report ; CERC-95-1)

1. Ocean waves — Measurement. 2. Water waves — Statistical  
methods. 3. Hydrodynamics — Measurement. I. United States. Army.  
Corps of Engineers. II. U.S. Army Engineer Waterways Experiment  
Station. III. Coastal Engineering Research Center (U.S. Army Engineer  
Waterways Experiment Station) IV. Neptune Sciences, Inc. V. Field  
Wave Gaging Program (U.S.) VI. Series: Contract report (U.S. Army  
Engineer Waterways Experiment Station) ; CERC-95-1.

TA7 W34c no.CERC-95-1

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## PREFACE

This report was published by the U.S. Army Engineer Waterways Experiment Station (WES) and was funded by the Field Wave Gaging Program (FWGP), a work unit of the Coastal Field Data Collection Program (CFDCP). Program manager of the CFDCP was Ms. Carolyn Holmes; technical monitors at Headquarters, U.S. Army Corps of Engineers were Messrs. John G. Housley, John H. Lockhart, and Barry W. Holliday.

The FWGP was managed at the WES Coastal Engineering Research Center (CERC) by Mr. David McGehee, under the supervision of Mr. William L. Preslan, Chief, Prototype Measurement and Analysis Branch, and Mr. Thomas W. Richardson, Chief, Engineering Development Division. Director of CERC was Dr. James R. Houston and the Assistant Director was Mr. Charles C. Calhoun, Jr.

The survey that initiated this report was developed by Mr. McGehee. The key work of tabulating and presenting the results was accomplished by Mr. Daniel Eckard of Neptune Sciences, Inc., (NSI), with assistance by Dr. Marshall Earle and Mr. David Zwack. The work was preformed by NSI under subcontract to Evans Hamilton, Inc.; their excellent administrative support is appreciated. However, the principal acknowledgement for this report is to the 212 respondents who the time to complete the survey and provide their valuable comments.

At the time of publication of this report, WES Director was Dr. Robert W. Whalin and Commander was COL Bruce K. Howard, EN.

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## **1. INTRODUCTION**

The U.S. Army Corps of Engineers established the Field Wave Gaging Program (FWGP) within the Coastal Engineering Research Center (CERC) to obtain and provide wave data and related products for use in planning, designing, and operating coastal projects. Wave information, such as that provided by the FWGP, is critically important for these applications. In cooperation with various state and Federal agencies, the FWGP operates over 50 wave gages (1994). Since the early 1970's, over 500 gage-years of data have been collected.

The volume of data that have been and are being acquired as well as higher FWGP visibility, wider applications by more users and FWGP partners, and improved technology are driving development of a comprehensive database so that FWGP wave information can be efficiently and economically provided to users. One step in this direction has been preparation of the FWGP Wave Data Analysis Standard which will promote quality and uniformity of the contents of the database. The FWGP Wave Data Users' Needs Survey is another step in moving toward the design of the data management and distribution system through which FWGP data and products will become available. These and following steps are and will be assuring that the investment in FWGP wave data collection provides significant benefits for the Corps of Engineers as well as other wave information users.

## **2. REPORT ORGANIZATION**

This report briefly describes the survey and the analysis of responses. After the text, the following information is included as a set of appendices. Different types of results and results based on different categories of responses are separated by blank sheets.

- Copy of survey (cover memorandum and questionnaire)
- Graphical presentations of results
- Tabulated reports of results
- "Other" responses
- Response comments and suggestions

Later sections of this report describe survey design, distribution, data analysis, and how results may be interpreted. With these descriptions, information in each appendix is generally self-explanatory.

This report provides statistical results from the survey, but it does not interpret these results. Interpretations will be made by the FWGP to help design the data management and distribution system through which FWGP data and products will become available.

### **3. SURVEY DESIGN**

Basic design goals were to identify: wave information users, their reasons or organizational missions for wanting wave data, their applications, data and products that they use, characteristics of needed data and products, their preferred product schedules, and their preferred delivery media. Several iterations of the survey design produced a short questionnaire that could be completed in approximately five minutes and that could be optically scanned for later analysis. An opportunity was provided for survey recipients to offer prose comments and/or suggestions.

### **4. SURVEY DISTRIBUTION**

A mailing list of potential wave information users was developed. It included at least one contact for each Army Corps of Engineers coastal Division and District, for each Federal agency with a coastal mission, for a state agency in each coastal state, and for each university involved with coastal research or coastal engineering. In most cases, there were multiple contacts for these organizations. The list also included scientists and engineers in private industry, participants in most recent and planned coastal processes field experiments, and writers of recently published wave-related scientific and engineering papers.

The survey was mailed to 401 individuals and organizations. In addition, approximately 100 surveys were distributed within CERC. These surveys were identified so that responses could be separated from non-CERC Corps of Engineers personnel who are considered "within Corps" users of CERC program results (including those from the FWGP). The survey was not distributed to CERC, university, and contractor personnel who actively participate in the FWGP. The survey's cover memorandum also encouraged survey recipients to distribute copies to their colleagues. Few non-original copies were returned. The total number of surveys that were received by individuals was approximately 510. The number of returned surveys totalled 212 resulting in an approximate 42% return rate.

### **5. SURVEY ANALYSIS AND RESULTS**

Returned forms were optically scanned and survey data were placed into a FoxPro™ database on a PC-type computer. FoxPro's procedural language was used to analyze the data. Answers corresponding to a choice of "Other" for some questions were entered manually into a WordPerfect™ file. Prose comments and suggestions written on the survey's comment page also were entered manually into a WordPerfect™ file. Printed copies of these files are provided with this report after the statistical results.

Identical statistical analysis was performed for several categories of responses. Statistical analysis calculated the number of selections of each choice in a given question, the percentage of selections based on a category's population, and the percentage of selections based on the total number of selections of all choices in a given question. Because some responses did not include answers to all questions and more than one selection may occur for a given question, selection



percentages based on a category's population need not total 100%. A few responses included more than one selected choice for questions to which one answer was expected. These responses were not edited or excluded from analysis. Selection percentages based on the total number of selections for a given question total 100% with any apparent differences from 100% caused by rounding printed percentages to the nearest 0.1%.

The percentage of selections based on a category's population provides the percentage of responses (i.e. from individuals) in the category with the noted choice. The percentage of selections based on the total number of selections of all choices in a given question provides the noted choice's selection percentage relative to the total number of selected choices. When small numbers of responses occur for a category, survey users should consider that the results may not be statistically representative.

Graphical presentations of statistical results are provided for the following response categories:

- Total (Composite) Population (212 responses, 100%)
- Corps of Engineers (97 responses, 46%)
- Corps of Engineers, not CERC (55 responses, 26%)
- CERC (42 responses, 20%)
- Not Corps of Engineers (115 responses, 54%)

These listed percentages are based on the total number of responses (212). The Corps of Engineers, not CERC, category represents Corps of Engineers users of wave information provided by the FWGP who are not within CERC. The vast majority of these responses were from engineering personnel in Division and District Offices.

An overall percentage pie chart shows the distribution of responses by organizational affiliation. The following plots are provided for each of the listed categories:

- Percentage Pie Chart, Primary Field of Work
- Percentage Pie Chart, Highest Degree Obtained
- Percentage Bar Chart, Applications of Wave Data and Products
- Percentage Bar Chart, Wave Data and Products Used
- Percentage Bar Chart, Locations of Needed Wave Data
- Percentage Bar Chart, Preferred Schedule for Products
- Relative Preference Bar Chart, Preferred Delivery Medium

Responses provided relative preferences for delivery media on a scale of 1 to 10 with 10 being the highest.

Detailed tabulated reports (2 pages each) were prepared from the database for the following categories of responses:

- Total (Composite) Population (212 responses)
- Organizational Affiliation
  - Corps of Engineers (97 responses)
  - Corps of Engineers, not CERC (55 responses)
  - Corps of Engineers, CERC (42 responses)
  - Not Corps of Engineers (115 responses)
  - University/Academia (36 responses)
  - Private (27 responses)
  - Other Federal Government (23 responses)
  - State/Local Government (13 responses)
  - Other Affiliation (6 responses)
- Primary Field of Work
  - Engineering (120 responses)
  - Science (71 responses)
  - Planning (14 responses)
  - Management (12 responses)
  - Construction/Operations (11 responses)
  - Regulatory (4 responses)
- Application(s) of Wave Data and Products
  - Coastal Engineering (150 responses)
  - Coastal Processes (138 responses)
  - Scientific Research (113 responses)
  - Environmental (67 responses)
  - Coastal Zone Management (49 responses)
  - Ocean/Offshore Engineering (46 responses)
  - Forecasting (46 responses)
  - Maritime Operations (37 responses)
  - Other Application (23 responses)
  - Military Operations (19 responses)

## 6. TABULATED REPORT INTERPRETATION EXAMPLES

A few examples from the total (composite) population tabulated report show how to interpret results in the tabulated reports. Statistics in these reports could be used to produce many more graphical products.

The tabulated reports follow the organization of the survey questionnaire. The population (category) covered by each report and the number of responses in the population are shown at the top.

For the total (composite) population of 212, there were 232 choices for "primary field of work" showing that some responses included more than one selection. Most responses (120) were for engineering, 56.6% based on this category's population (212) and 51.7% based on the total number of selections (232) for this question. The later percentage is shown in the corresponding pie chart.

For questions to which several selections were usually made, differences between selection percentages based on a category's population and on the total number of selections for a question are important for interpretations. For the total (composite) population of 212, there were 688 choices for "application(s) of wave data and products" showing that many responses included more than one selection. Most responses (150) were for coastal engineering, 70.8% based on this category's population (212) and 21.8% based on the total number of selections (688) for this question. In other words, 70.8% of the responses identified coastal engineering as an application, but coastal engineering represented 21.8% of all identified applications. For questions with several expected selections, percentages based on a category's population (number of responses) are shown in corresponding bar charts. These percentages correspond to the percentages of probable wave information users who made the described selection.

The "preferred delivery medium" question requested that different media be ranked on a scale from 1 to 10 with 10 corresponding to the highest preference. The tabulated reports show the number of rankings for each type of media (9 types), their percentages relative to the category population, and the average ranked value of each media type. For the total (composite) population of 212, most responses ranked all media types, but some did not resulting in a maximum media type percentage response of 92.0% for "computer disk". These percentages mainly indicate that responses did not rank all media and are not important although low percentages correlate with low averaged rank values. Percentages are not given based on the total number of selections for the question because ranking of all media types would result in constant percentages of  $11.1\% = 100 \times (1/9)$ . Differences from this value would occur because some responses did not rank some media types. The average ranked value of each media type is the key result for this question. For the total (composite) population, "computer disk" had the highest average ranked value (8.24) and "electronic network" had the next highest value (7.82). "telephone - electronic voice", "nine-track tape", and "radio broadcast" had the lowest average values (3.08, 3.03, and 2.57 respectively).

## 7. SUMMARY

A Wave Data Users' Needs Survey was performed to support the FWGP. Survey results will contribute to design of the data management and distribution system through which FWGP data and products will become available. Approximately 510 surveys were distributed to a wide variety of possible wave information users including contacts within Corp of Engineers Division and District offices, CERC personnel, and contacts outside of the Corps of Engineers. The number of returned surveys totalled 212 resulting in an approximate 42% return rate. Responses were optically scanned and survey data were placed into a database. Statistical analysis provided quantitative results for a variety of response categories including FWGP data and product users within the Corps of Engineers but not within CERC, within CERC, and outside of the Corps of Engineers. Results are provided as graphical presentations and as detailed tabulated reports.

# **Appendix A Copy of Survey (Cover Memorandum and Questionnaire)**

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DEPARTMENT OF THE ARMY  
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS  
3806 HALLS FERRY ROAD  
VICKSBURG, MISSISSIPPI 39180-6199

REPLY TO  
ATTENTION OF

CEWES-CD-P (340a)

16 May 1994

MEMORANDUM FOR WAVE DATA USERS

SUBJECT: Request for Input to Survey

1. The U.S. Army Corps of Engineers established the Field Wave Gaging Program (FWGP) to obtain wave data and related products for use in planning, designing, and operating coastal projects. The Program, in cooperation with various state and federal agencies, supports over 50 wave gages in 1994, and has funded over 500 gage-years of historical data since the early 1970's. The majority of the data are provided through four wave gaging networks: the Coastal Data Information Program, operated by the Scripps Institution of Oceanography; the Florida Coastal Data Network, operated by the University of Florida; the Moored Buoy Program, operated by the National Data Buoy Center, and the Network for Engineering Monitoring of the Oceans, an "in-house" network operated by the U.S. Army Engineer Waterways Experiment Station's Coastal Engineering Research Center. By including all data collected by these networks, as well as data from other sources, the FWGP database contains essentially all long-term wave measurements available for the U.S. coastline.

2. Traditionally, Corps research needs were satisfied with a relatively simple database. Higher visibility for the Program, wider applications from an increasing number of partners, and improving technology are driving development of a more flexible, accessible, and efficient database capable of providing users with a variety of useful and economical products. One step in this direction has been production of the FWGP Wave Data Analysis Standard, which will promote quality and uniformity of the contents of the database. Another effort is the enclosed Wave Data Users Needs Survey. Results of this survey will strongly influence the design of the data management and distribution system, and thus the availability and cost of various products in the future.

3. The survey can be completed in a few minutes and conveniently returned in the enclosed stamped envelope. In attempting to "ask the right questions," we may have erred on the side of ease and brevity of the form. Please use the space provided for additional comments if the available choices seem inadequate.

4. Your participation in this survey is valuable input and greatly appreciated. You are encouraged to duplicate and distribute the survey to colleagues not included in the initial mailing. Please reply by 1 July 1994 to ensure your responses are tabulated. Responses will be tabulated in July and results published later in 1994. For additional information on the FWGP and its products, you may contact: by mail - the address on the response envelope; by telephone or Fax (601) 634-4666; by Electronic mail - FWGP @ PMAB.WES.ARMY.MI.

DAVID D. MCGEHEE, Manager  
Field Wave Gaging Program

Encl

HYDRAULICS  
LABORATORY

GEOTECHNICAL  
LABORATORY

STRUCTURES  
LABORATORY

ENVIRONMENTAL  
LABORATORY

COASTAL ENGINEERING  
RESEARCH CENTER

INFORMATION  
TECHNOLOGY LABORATORY

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6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

# FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY

## PERSONAL INFORMATION (Optional)

Name: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Organization: \_\_\_\_\_  
 Business Address: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Business Telephone Number: \_\_\_\_\_

## Highest Degree Obtained:

- ☐ High School/Other
- ☐ B.S./B.A.
- ☐ M.S./M.A.
- ☐ Ph.D.

Please mark appropriate boxes by filling in only the circle within the box, as follows:

☒ Properly marked box

USE ONLY A #2 PENCIL. DO NOT USE INK!

## Primary Field of Work:

- ☐ Science
- ☐ Engineering
- ☐ Construction/Operations
- ☐ Planning
- ☐ Management
- ☐ Regulatory

## Organizational Affiliation:

- ☐ Corps of Engineers
- ☐ Other Federal Government
- ☐ State/Local Government
- ☐ Private
- ☐ University/Academia
- ☐ Other (specify) \_\_\_\_\_

## Application(s) of Wave Data and Products (select all that apply)

- ☐ Coastal Engineering
- ☐ Ocean/Offshore Engineering
- ☐ Coastal Processes
- ☐ Coastal Zone Management
- ☐ Military Operations
- ☐ Environmental (e.g., Water Quality)
- ☐ Scientific Research
- ☐ Forecasting
- ☐ Maritime Operations
- ☐ Other (specify) \_\_\_\_\_

© 1981 by National Computer Systems, Inc. Survey Form 3

PLEASE CONTINUE ON REVERSE SIDE

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25 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Wave Data and Products Now or Recently Used (select all that apply)

<input type="checkbox"/>	Individual Wave Record Time Series (i.e., elevation, pressure...)	<input type="checkbox"/>	Height
<input type="checkbox"/>	Non-directional Wave Spectra	<input type="checkbox"/>	Period
<input type="checkbox"/>	Directional Wave Spectra	<input type="checkbox"/>	Direction
<input type="checkbox"/>	Wave Parameters $\Longleftrightarrow$ Specific Parameters $\Longleftrightarrow$	<input type="checkbox"/>	
<input type="checkbox"/>	Still Water Level (mean depth during wave measurement)		
<input type="checkbox"/>	Climatological Wave Statistics Based on Measured Data		
<input type="checkbox"/>	Climatological Wave Statistics Based on Hindcasts		
<input type="checkbox"/>	Summaries Showing When/Where Measured Data Available		
<input type="checkbox"/>	Other (specify) _____		

**DO  
NOT  
WRITE  
IN  
THIS  
AREA**

- Specify which of the remaining items will directly contribute to your work or the mission of
- your organization (select all that apply)

### Preferred Schedule for Products

	Deep Water (>100m)
	Intermediate Water (>20m, <100m).
	Shallow Water (<20m)
	Estuaries, Bays, Harbors
	Other (specify) _____

<input type="checkbox"/>	Near Real-time	] Coverage will match scheduled e.g., data 1 month delivery monthly.
<input type="checkbox"/>	Daily	
<input type="checkbox"/>	Weekly	
<input type="checkbox"/>	Monthly	
<input type="checkbox"/>	Annually	
<input type="checkbox"/>	Intermittent (requested as needed)	

Coverage will match schedule -- e.g., data covering 1 month delivered monthly.

Preferred Delivery Medium (rank the value of these for your use and applications from 1 for the lowest to 10 for the highest preference)

lowest 1 2 3 4 5 6 7 8 9 10 highest

[illegible]

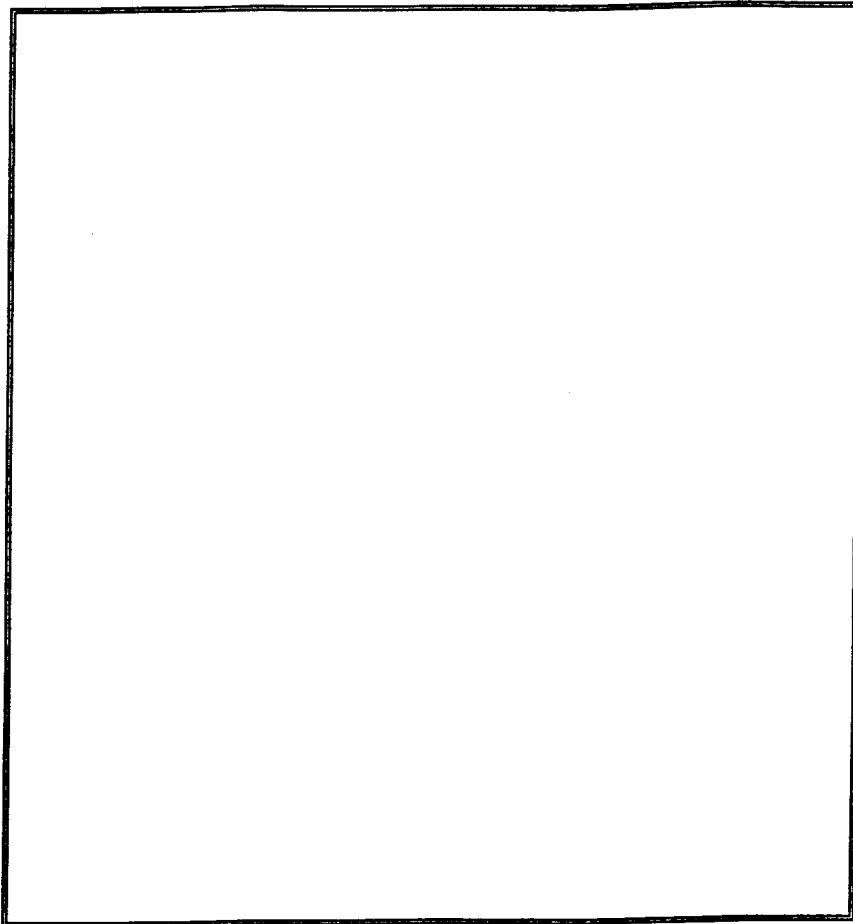
PLEASE INCLUDE COMMENTS ON THE FOLLOWING SHEET.

THANK YOU FOR YOUR PARTICIPATION!



FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

*Please provide comments or suggestions that you may have. For example, this space may be used to indicate particular wave data report products of interest or advice about maximizing usefulness of products. Use an additional sheet if necessary.*

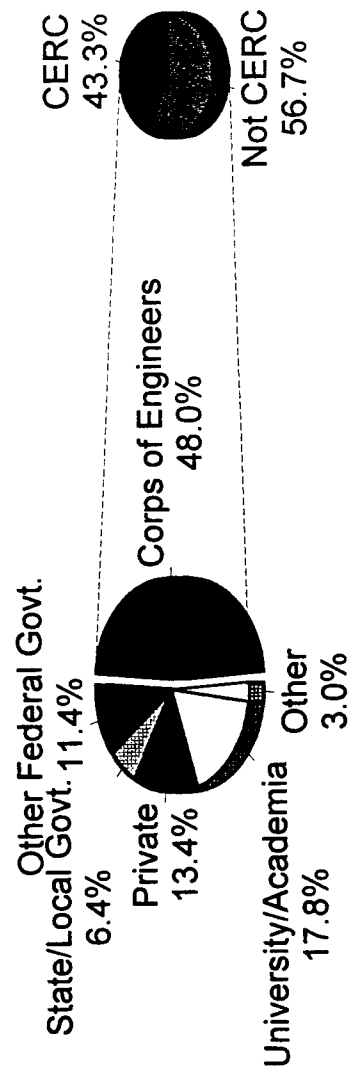


Office Use Only \_\_\_\_\_

## **Total Population**

# WAVE DATA USERS' NEEDS SURVEY

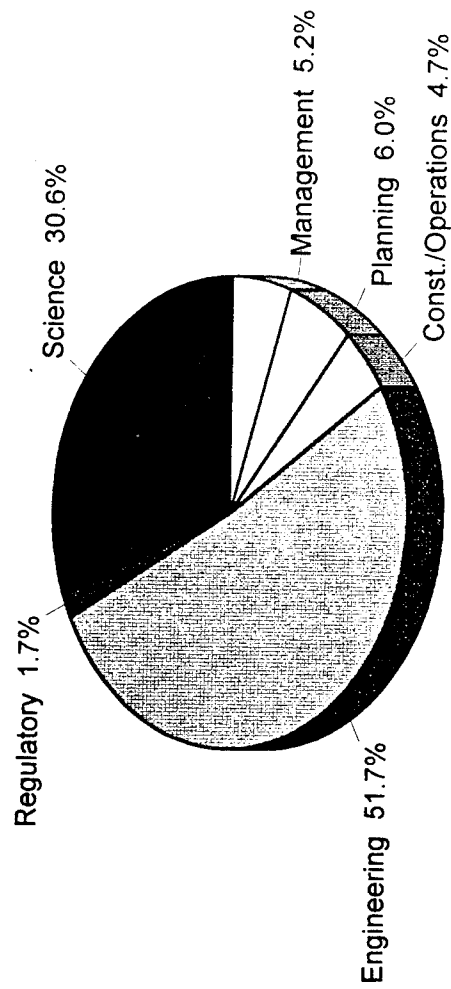
## Organizational Affiliation



Total Population

# WAVE DATA USERS' NEEDS SURVEY

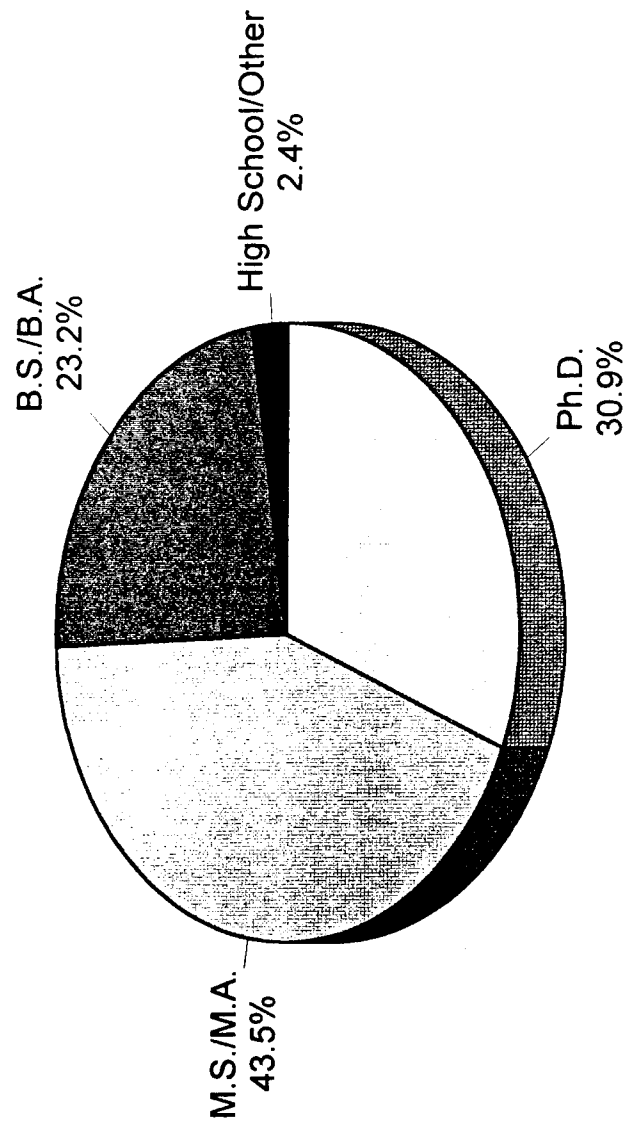
## Primary Field of Work



Total Population

# WAVE DATA USERS' NEEDS SURVEY

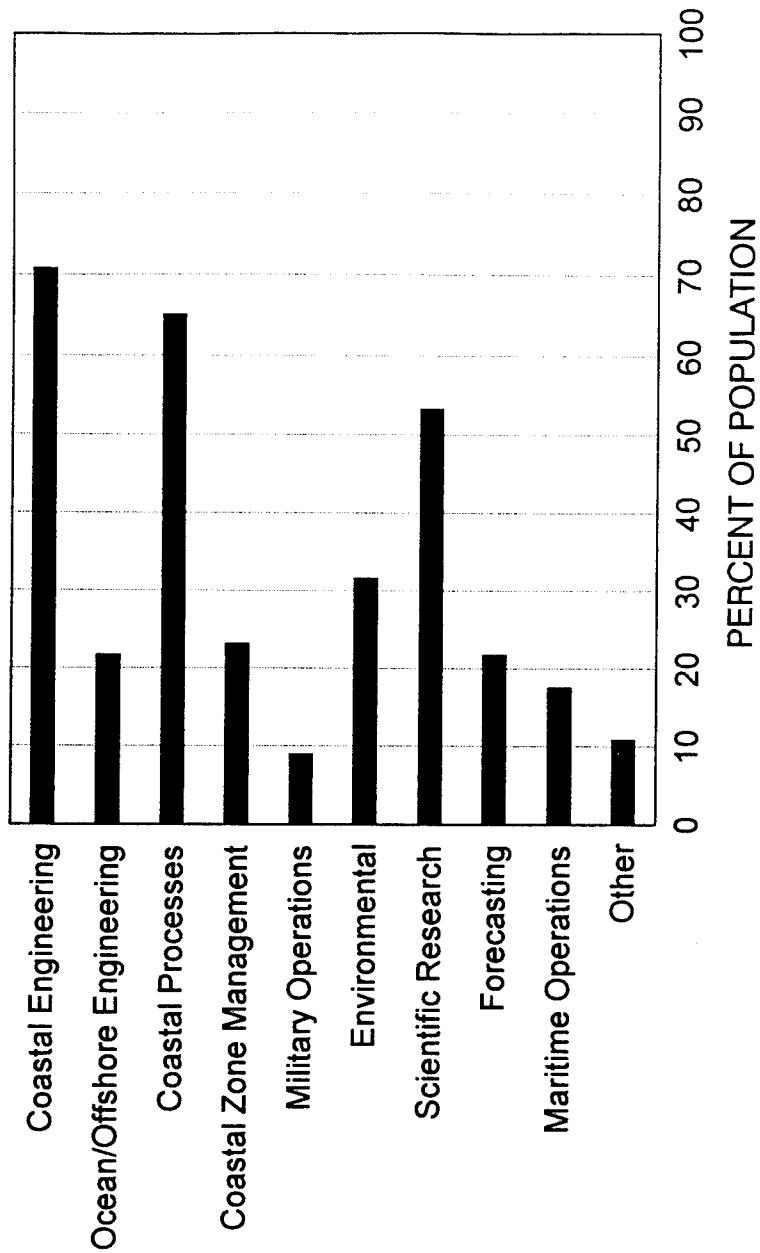
## Highest Degree Obtained



Total Population

# WAVE DATA USERS' NEEDS SURVEY

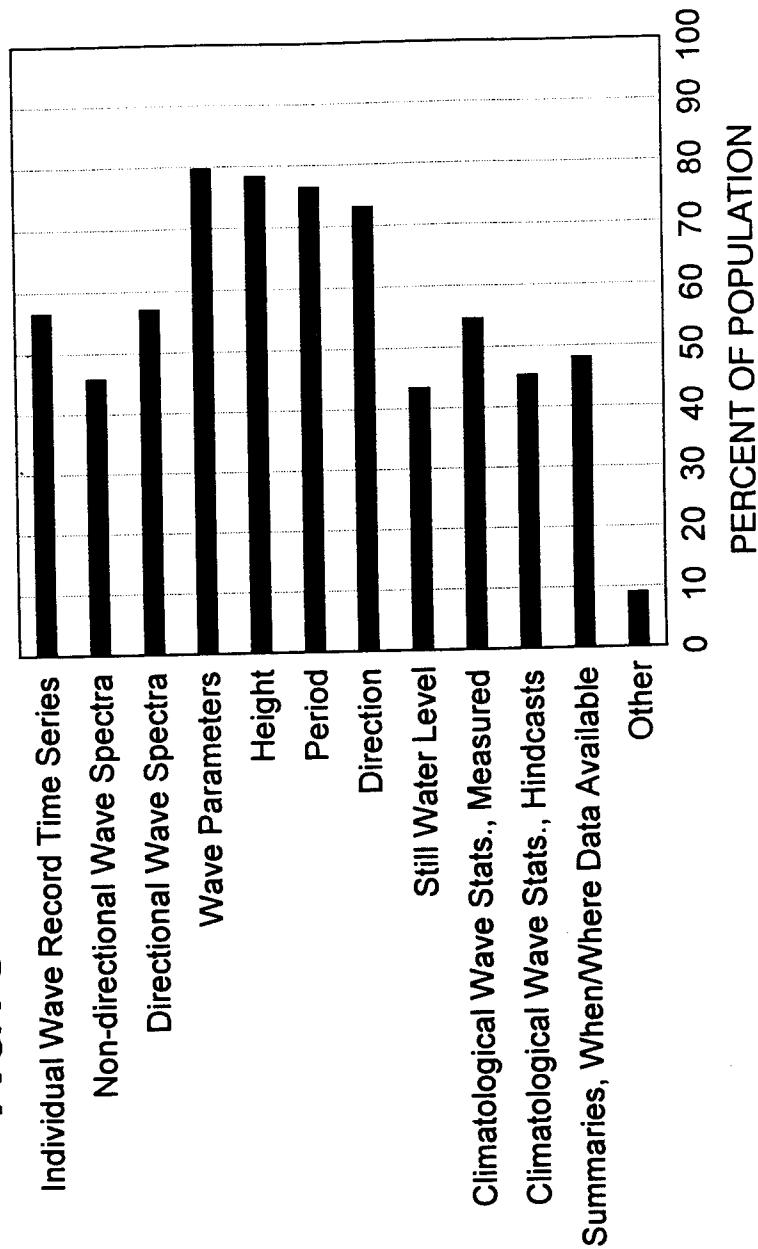
## Applications of Wave Data and Products



Total Population

# WAVE DATA USERS' NEEDS SURVEY

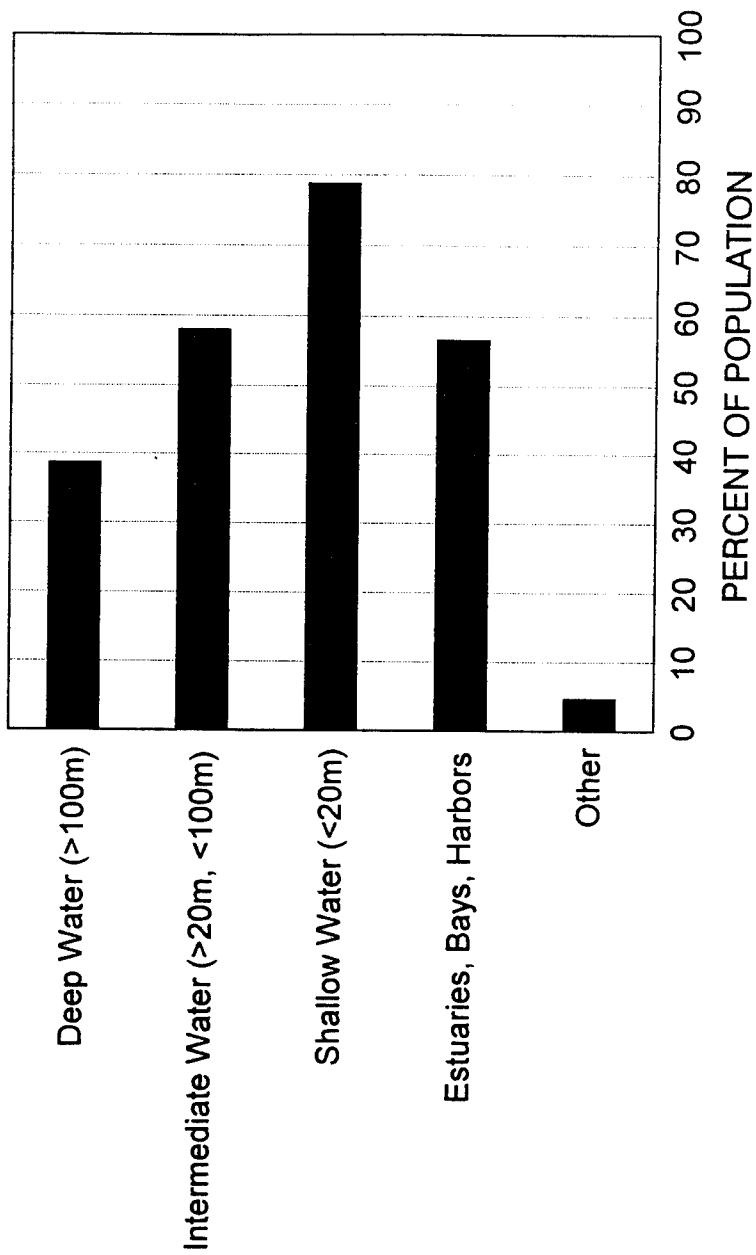
## Wave Data and Products Used



Total Population

# WAVE DATA USERS' NEEDS SURVEY

## Locations of Needed Wave Data

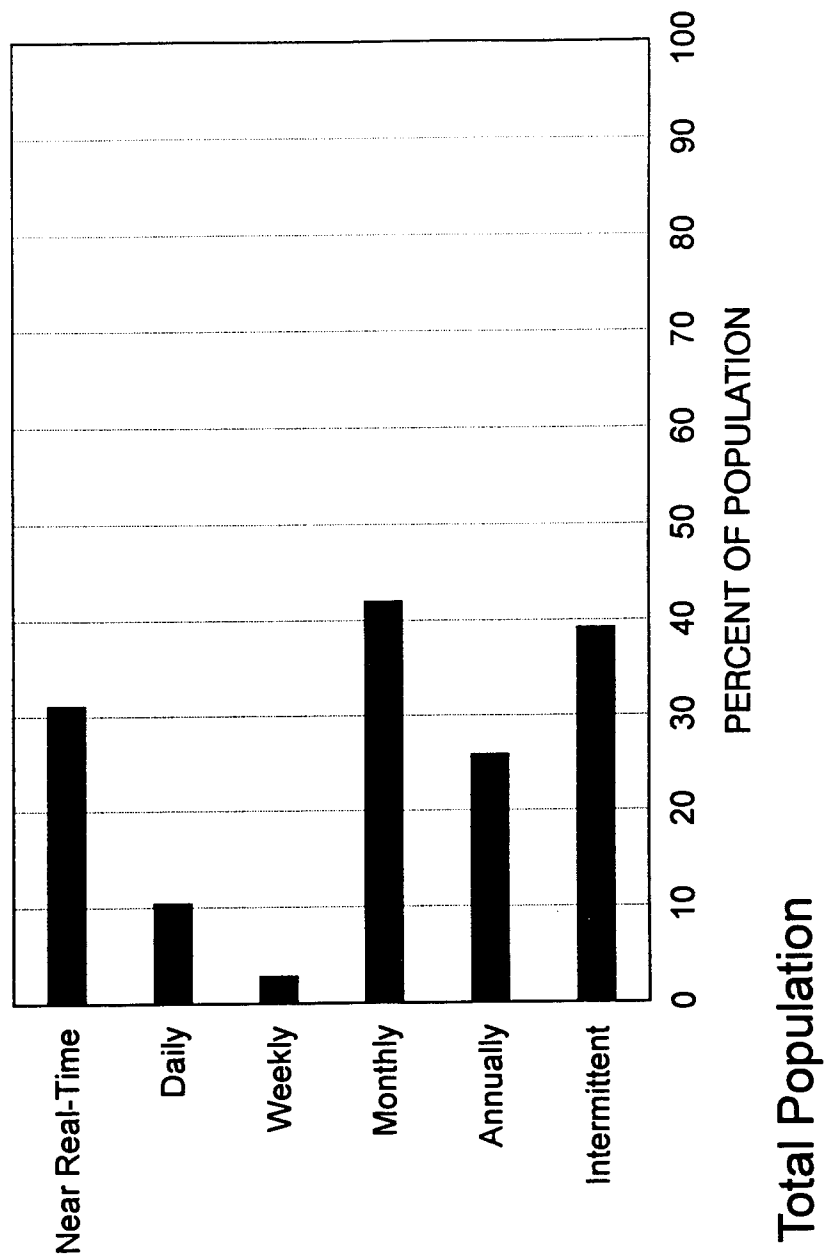


Total Population



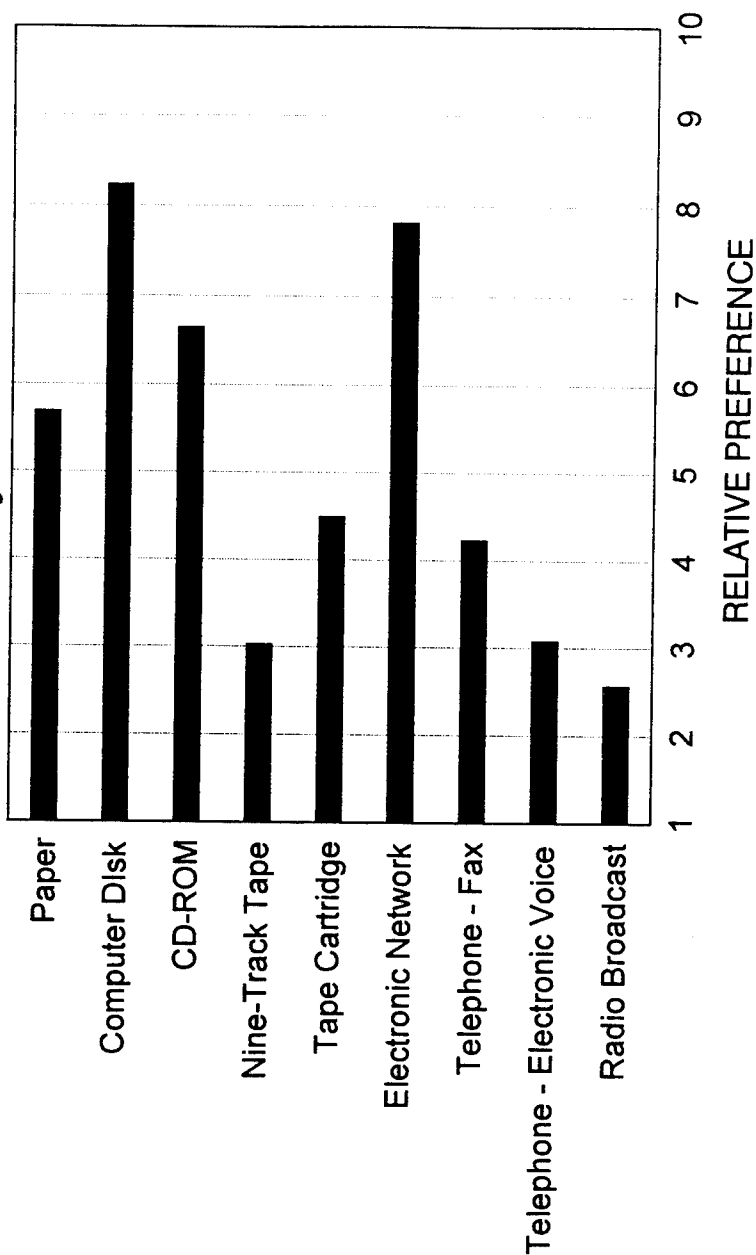
# WAVE DATA USERS' NEEDS SURVEY

## Preferred Schedule for Products



# WAVE DATA USERS' NEEDS SURVEY

## Preferred Delivery Medium

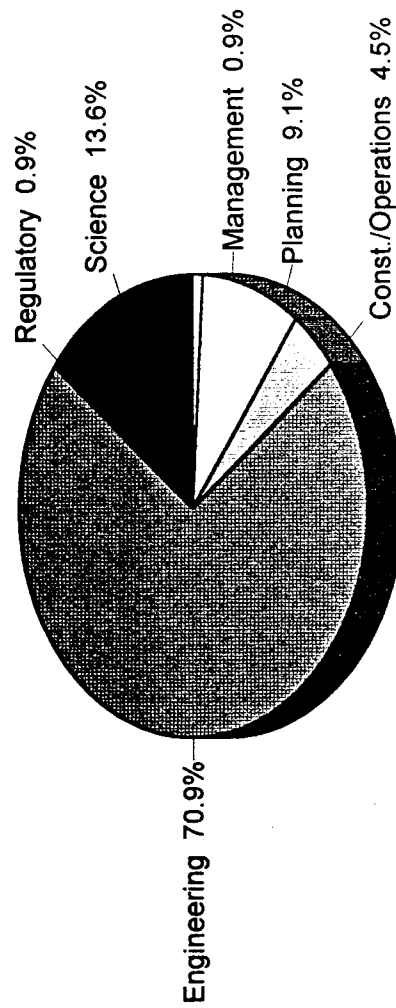


Total Population

## **Corps Respondents**

# WAVE DATA USERS' NEEDS SURVEY

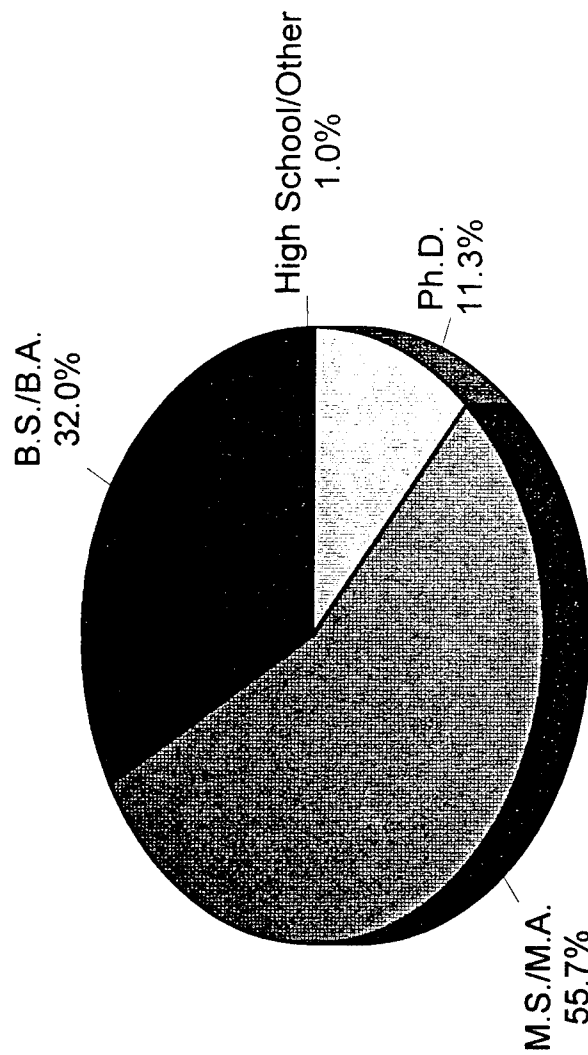
## Primary Field of Work



Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

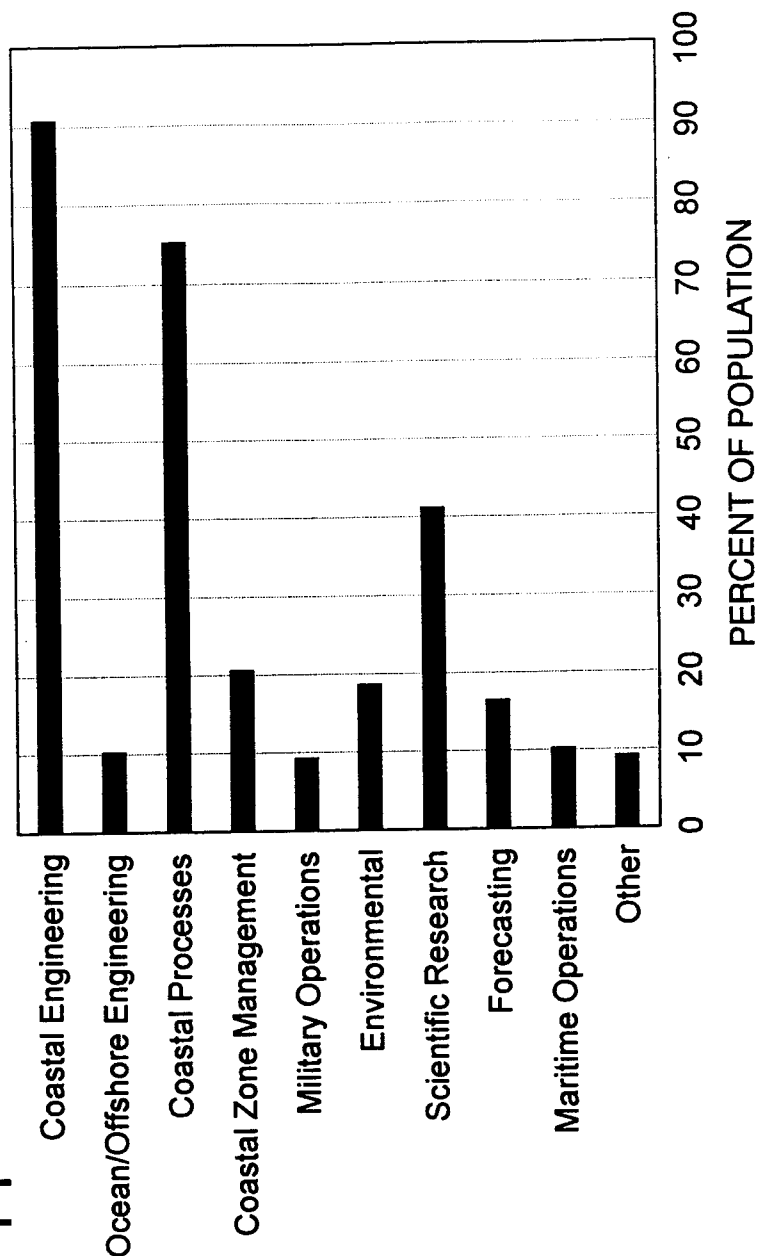
## Highest Degree Obtained



Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

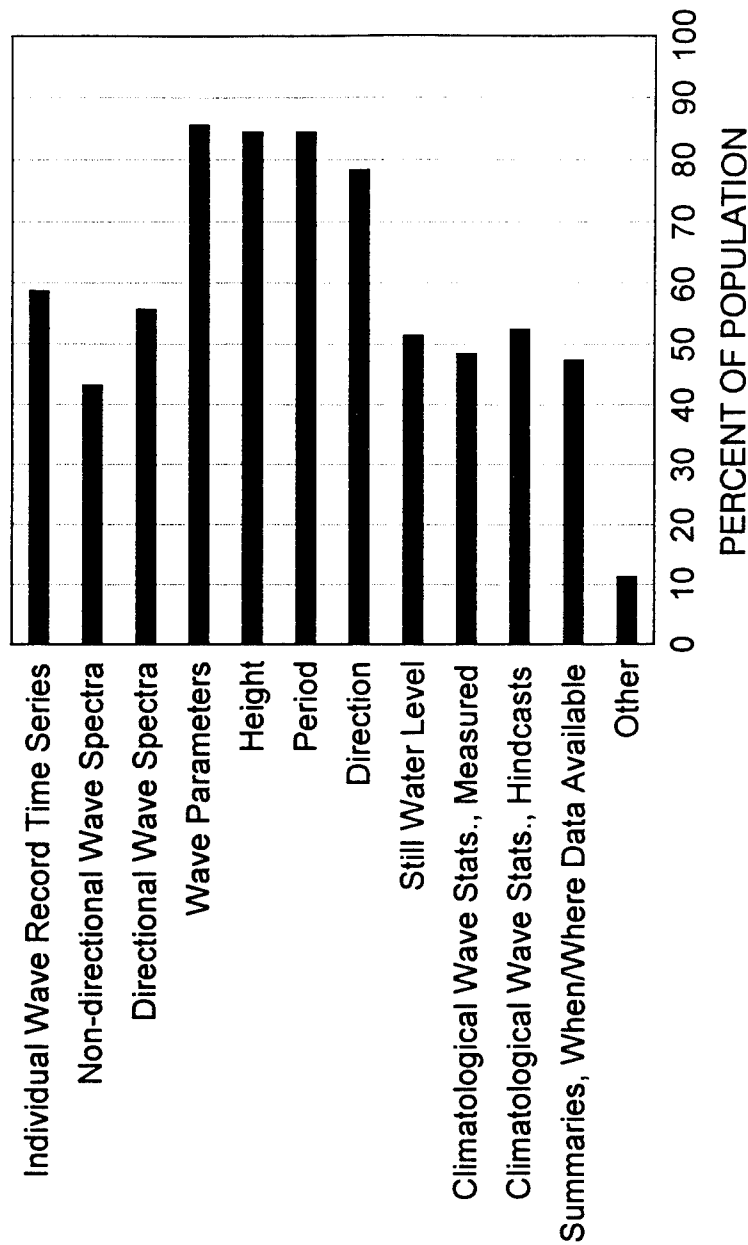
## Applications of Wave Data and Products



Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

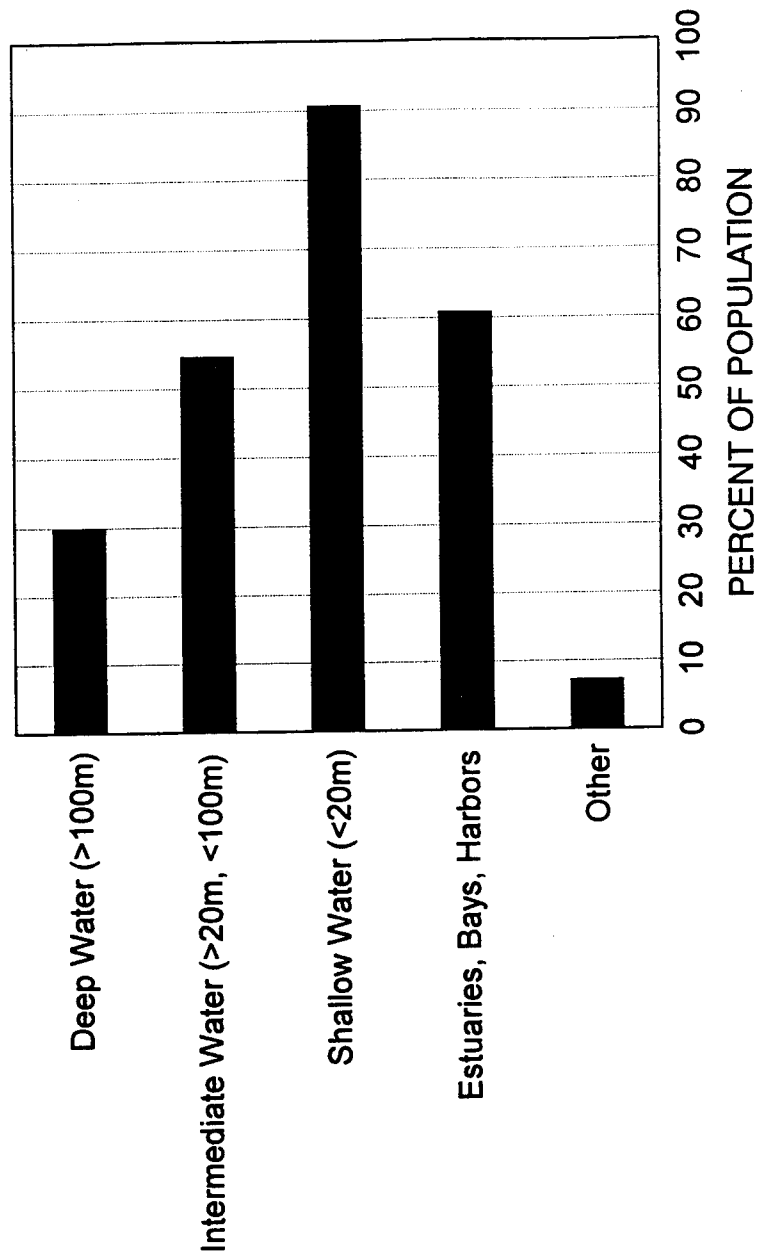
## Wave Data and Products Used



Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

## Locations of Needed Wave Data

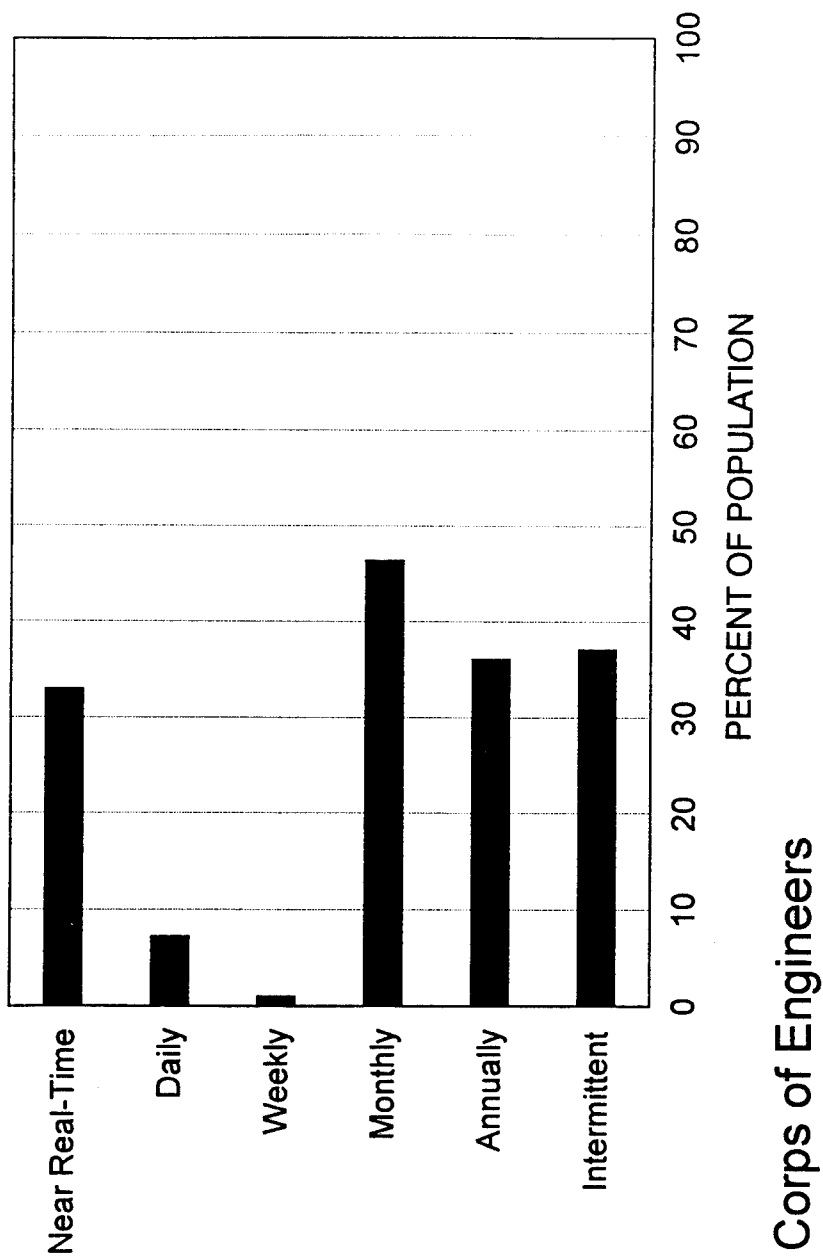


Corps of Engineers



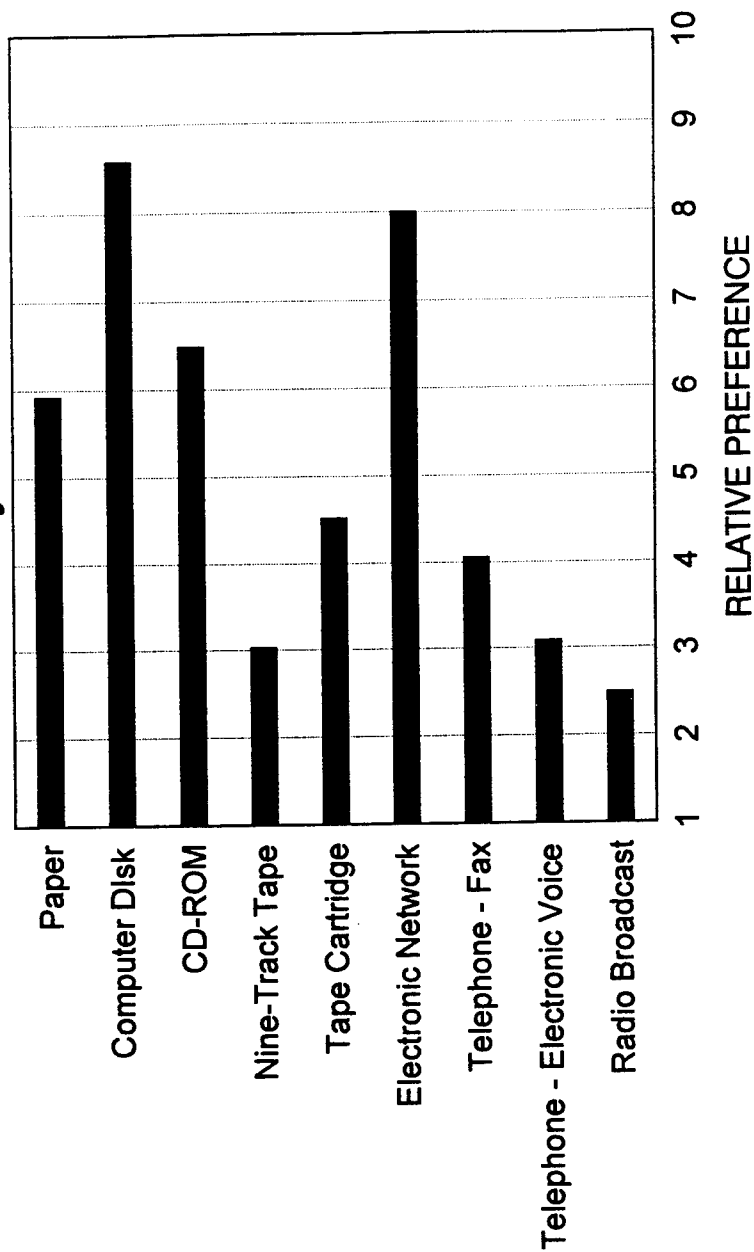
# WAVE DATA USERS' NEEDS SURVEY

## Preferred Schedule for Products



# WAVE DATA USERS' NEEDS SURVEY

## Preferred Delivery Medium

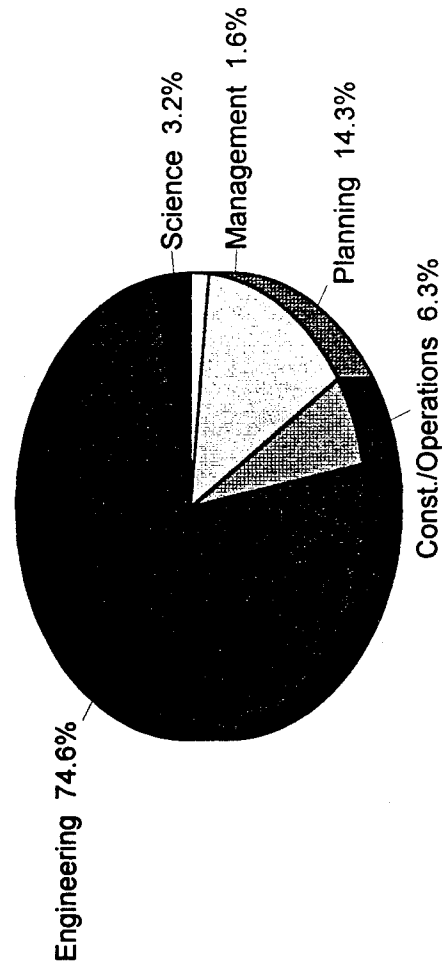


Corps of Engineers

## **Corps Respondents (Not CERC)**

# WAVE DATA USERS' NEEDS SURVEY

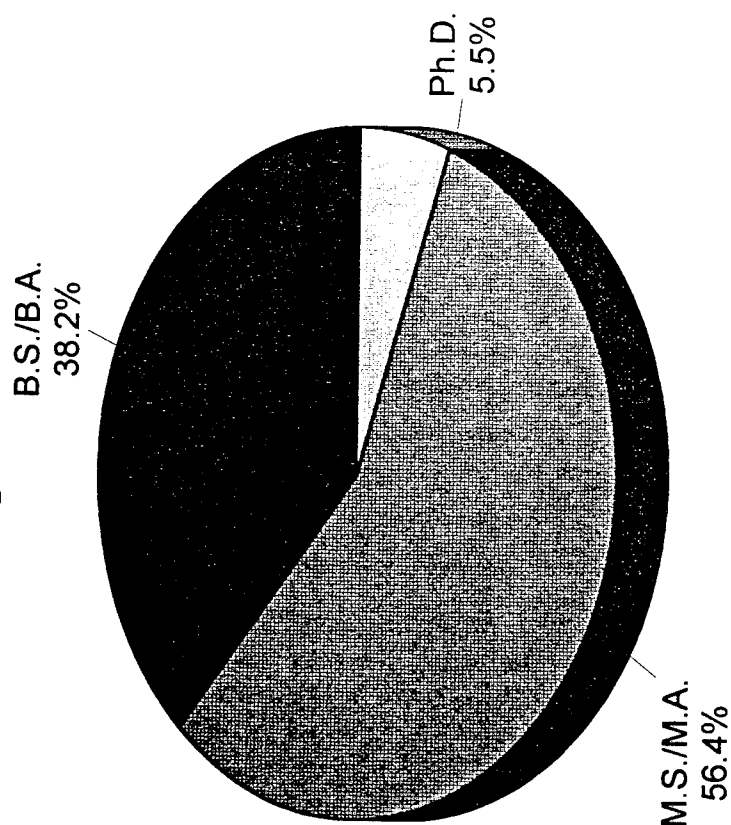
## Primary Field of Work



Corps of Engineers, Not CERC

# WAVE DATA USERS' NEEDS SURVEY

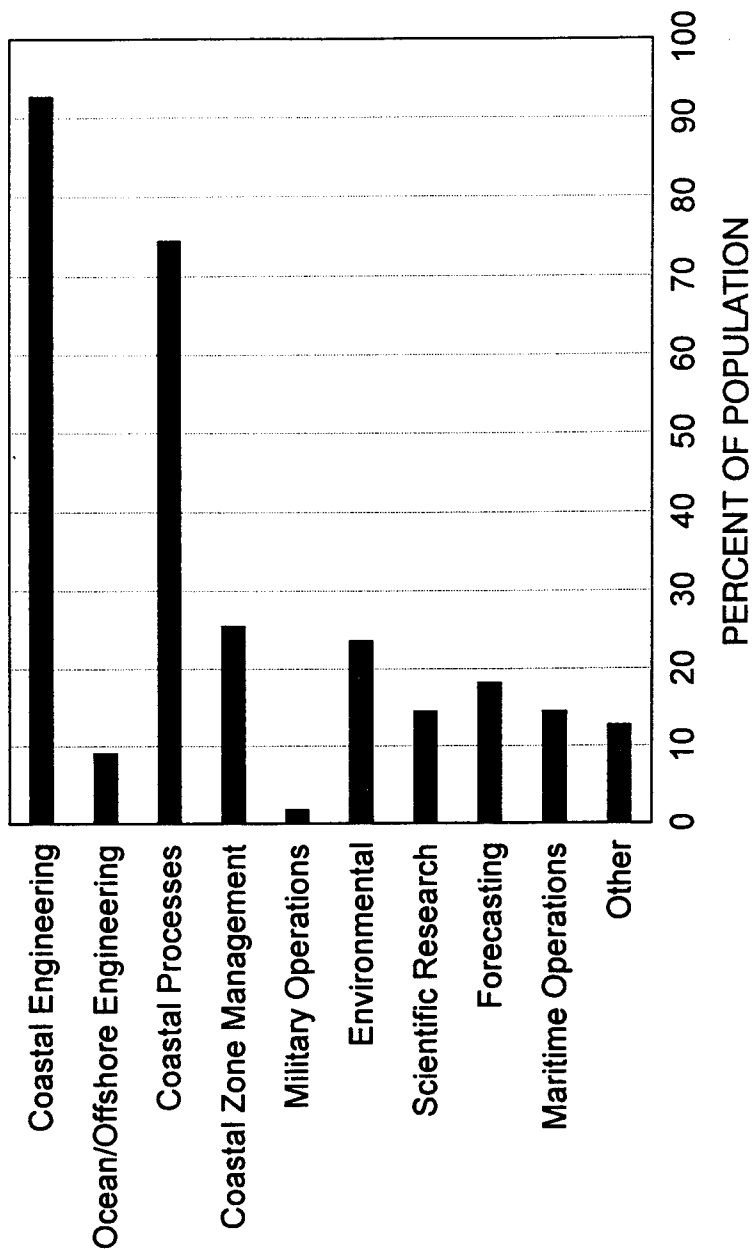
## Highest Degree Obtained



Corps of Engineers, Not CERC

# WAVE DATA USERS' NEEDS SURVEY

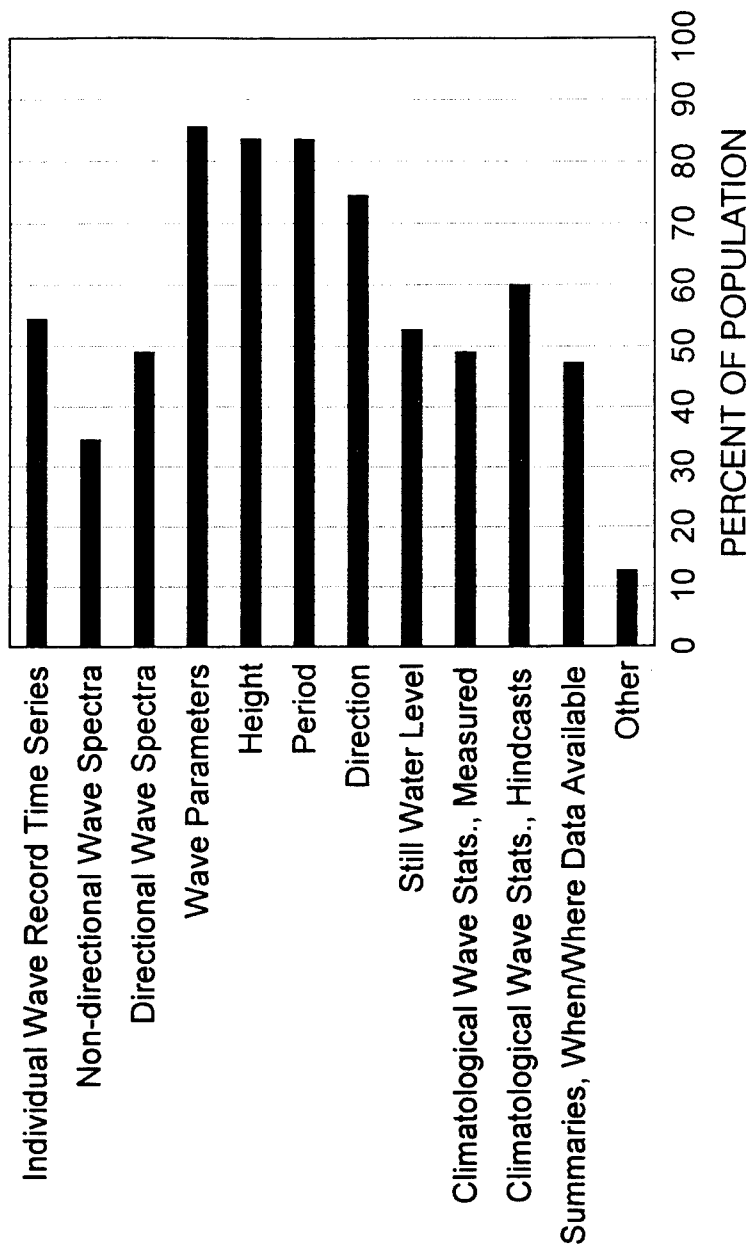
## Applications of Wave Data and Products



Corps of Engineers, Not CERC

# WAVE DATA USERS' NEEDS SURVEY

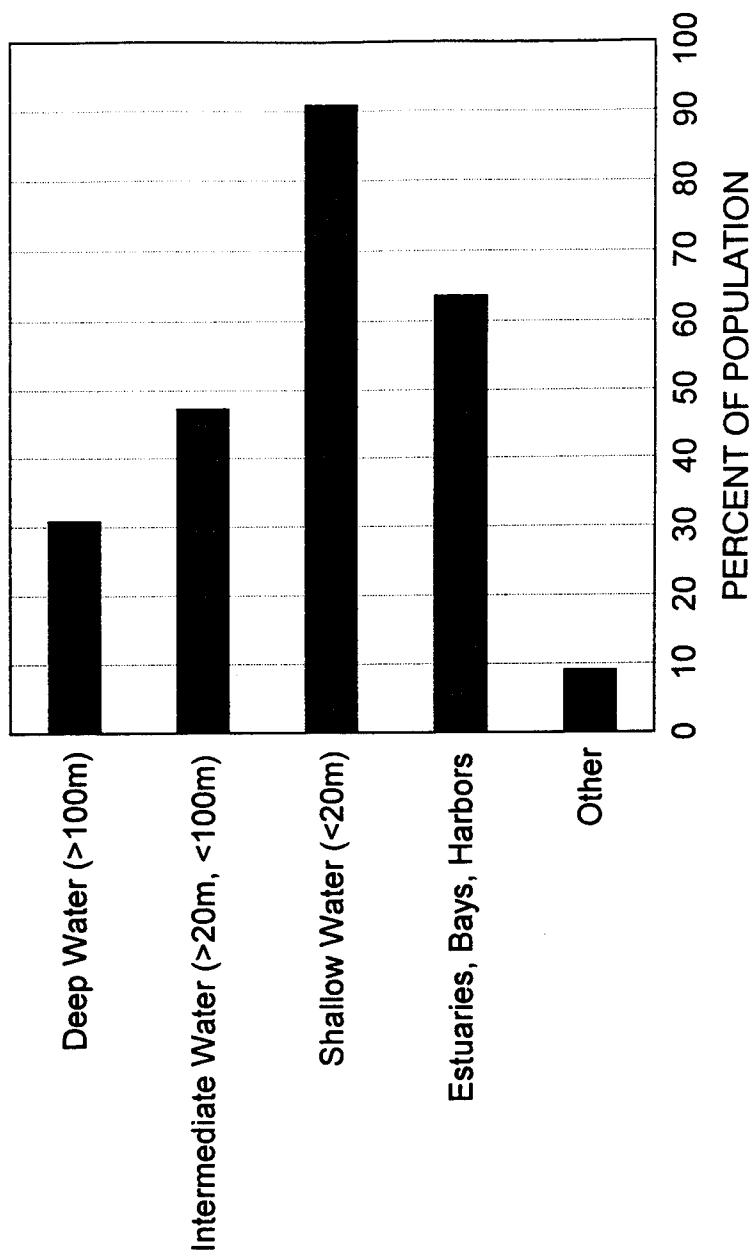
## Wave Data and Products Used



Corps of Engineers, Not CERC

# WAVE DATA USERS' NEEDS SURVEY

## Locations of Needed Wave Data

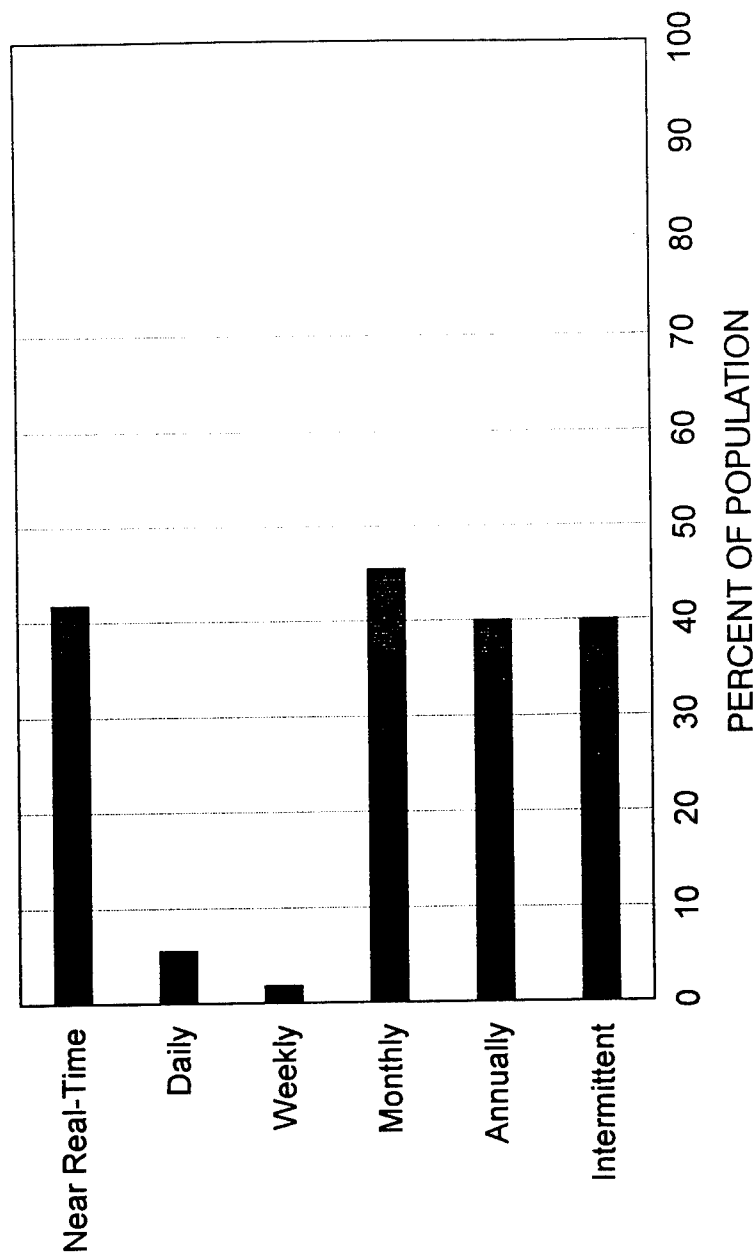


Corps of Engineers, Not CERC



# WAVE DATA USERS' NEEDS SURVEY

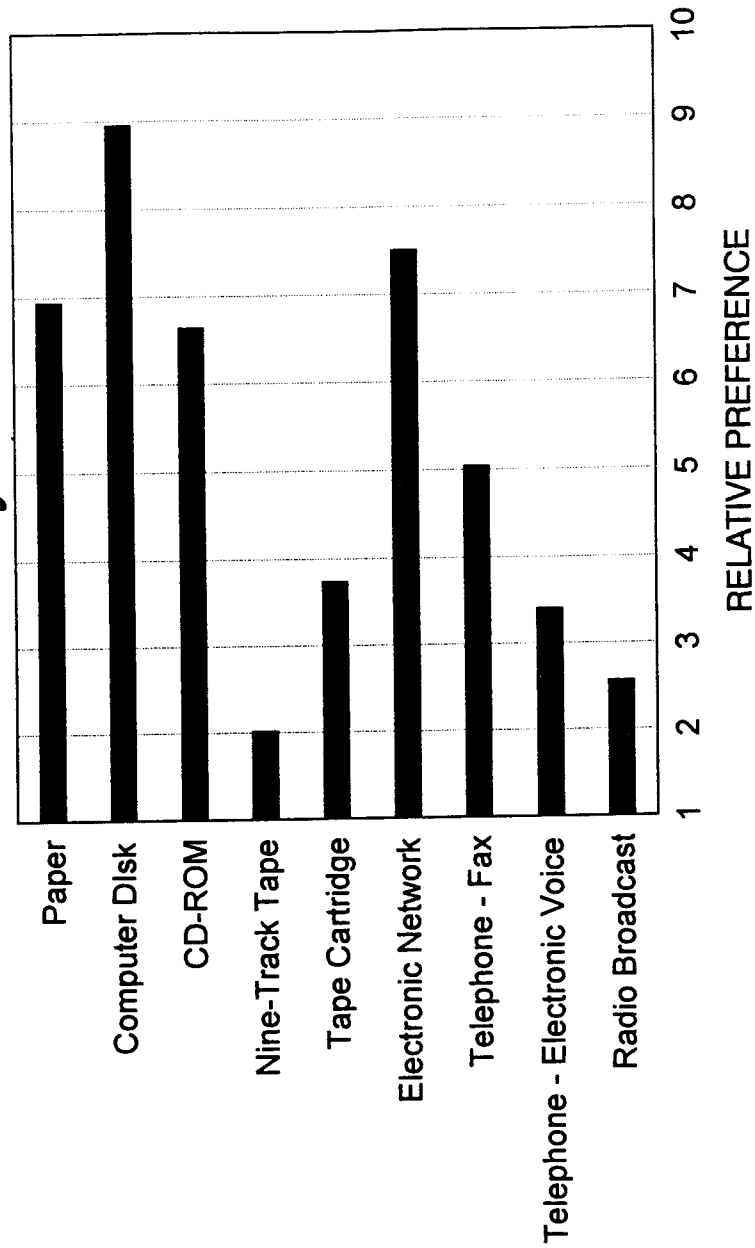
## Preferred Schedule for Products



Corps of Engineers, Not CERC

# WAVE DATA USERS' NEEDS SURVEY

## Preferred Delivery Medium

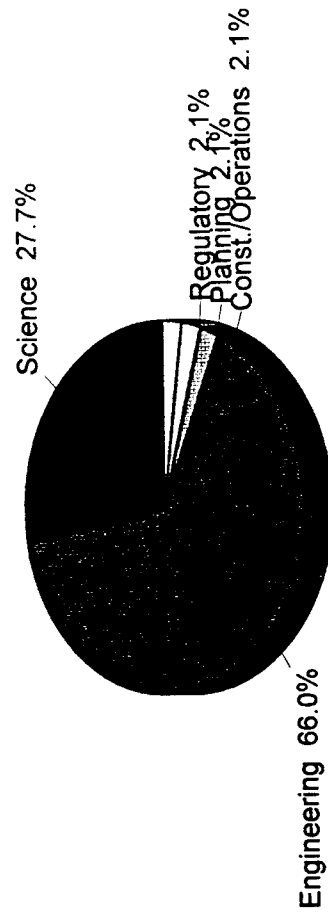


Corps of Engineers, Not CERC

## **CERC Respondents**

# WAVE DATA USERS' NEEDS SURVEY

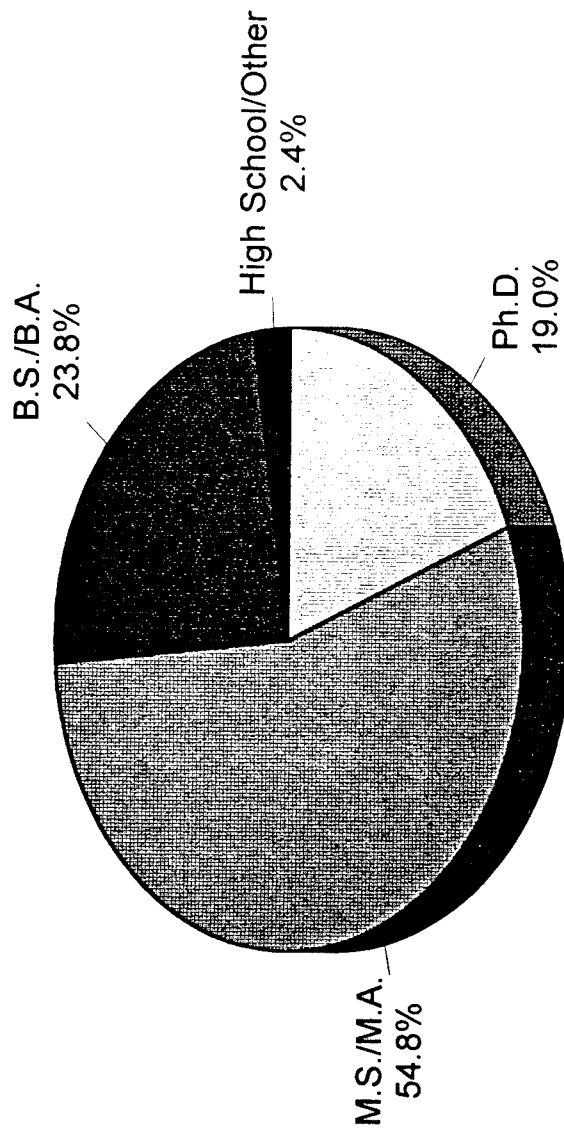
## Primary Field of Work



Corps of Engineers, CERC

# WAVE DATA USERS' NEEDS SURVEY

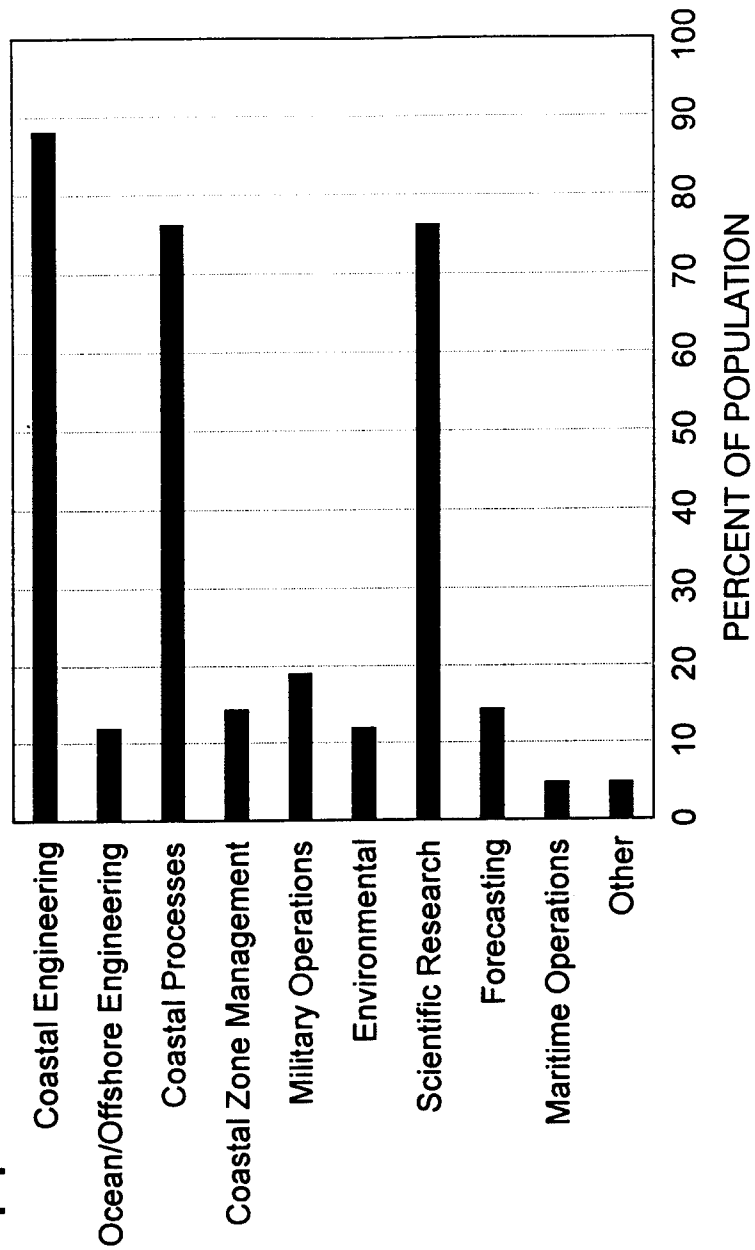
## Highest Degree Obtained



Corps of Engineers, CERC

# WAVE DATA USERS' NEEDS SURVEY

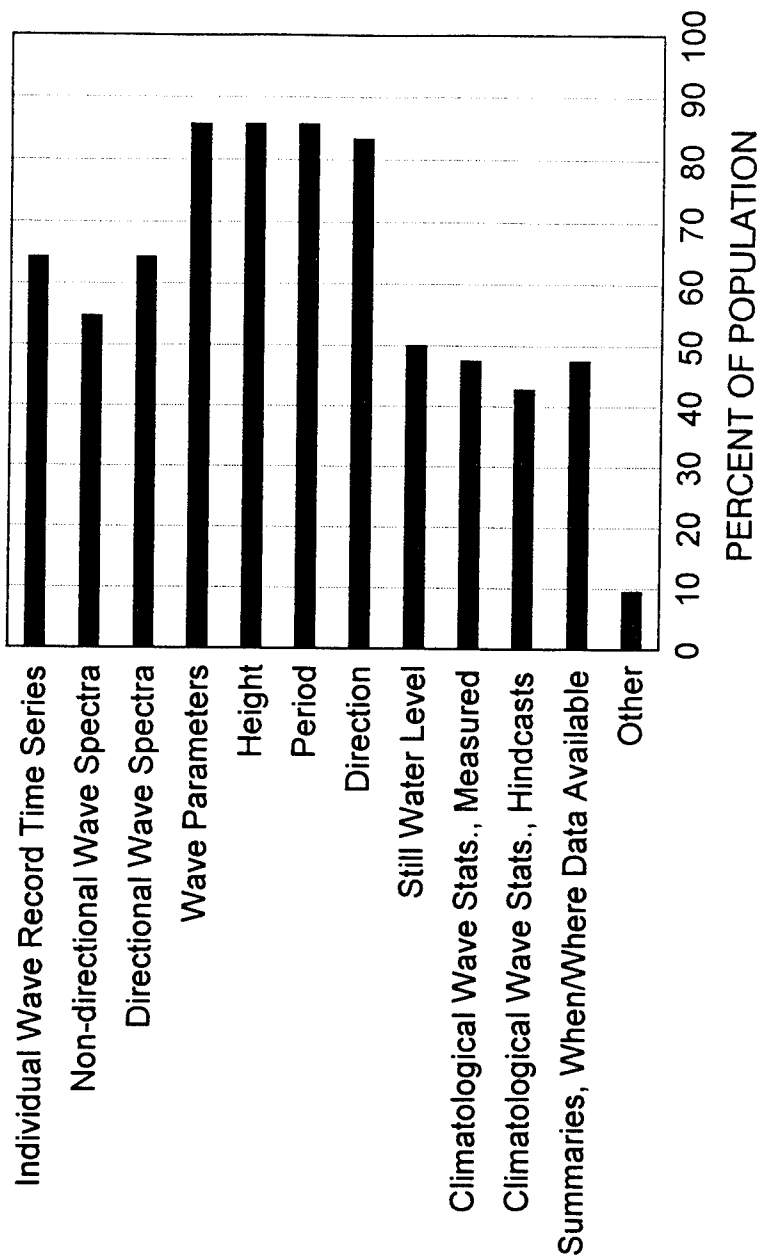
## Applications of Wave Data and Products



Corps of Engineers, CERC

# WAVE DATA USERS' NEEDS SURVEY

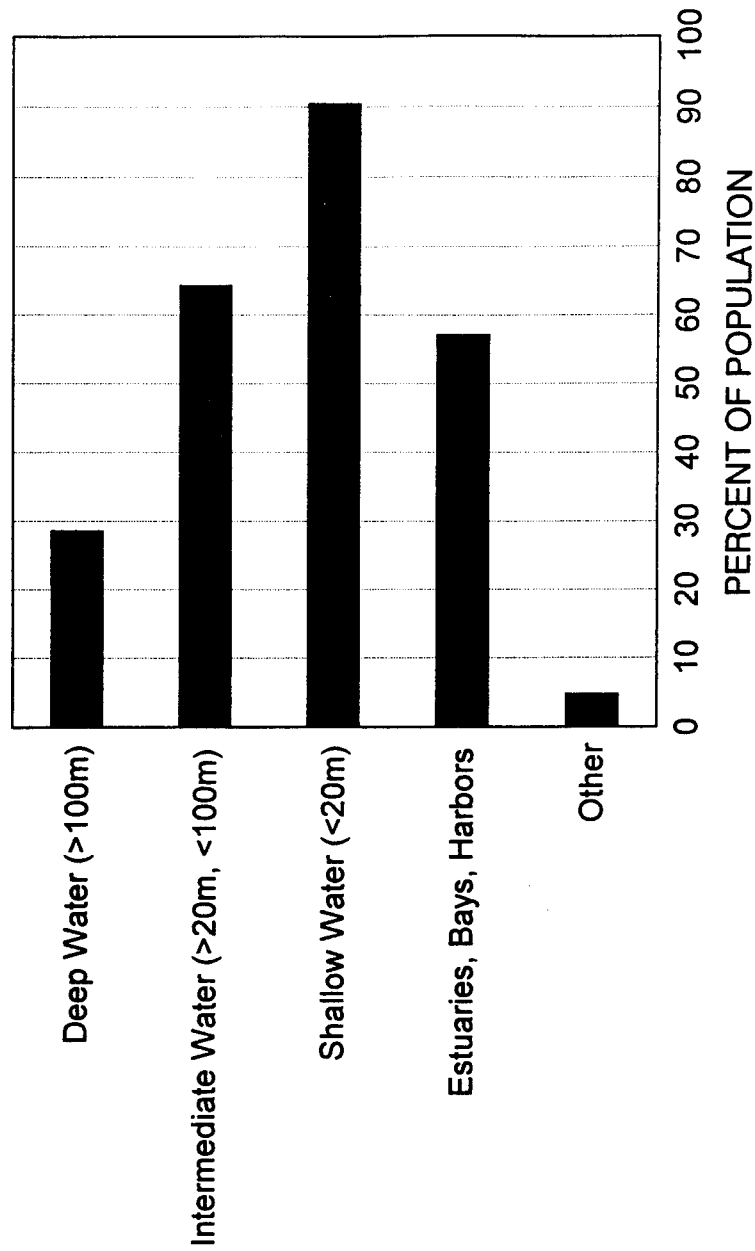
## Wave Data and Products Used



Corps of Engineers, CERC

# WAVE DATA USERS' NEEDS SURVEY

## Locations of Needed Wave Data

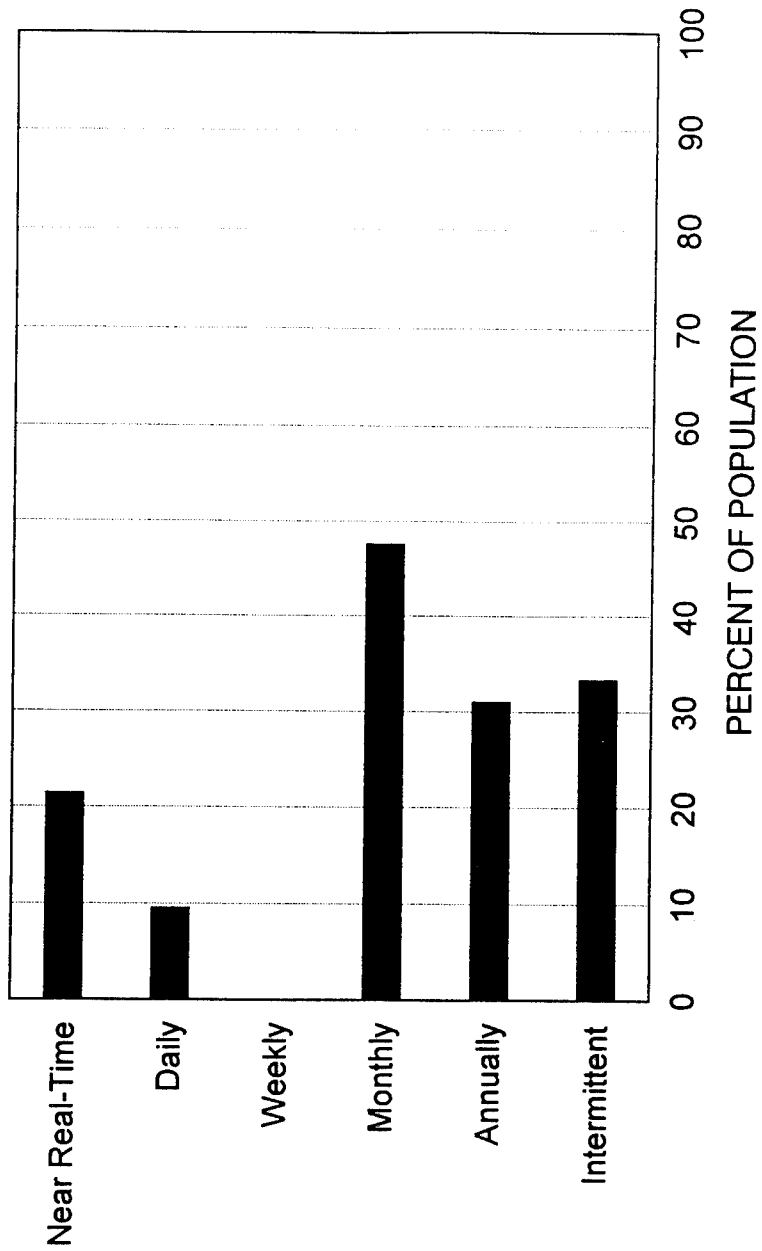


Corps of Engineers, CERC



# WAVE DATA USERS' NEEDS SURVEY

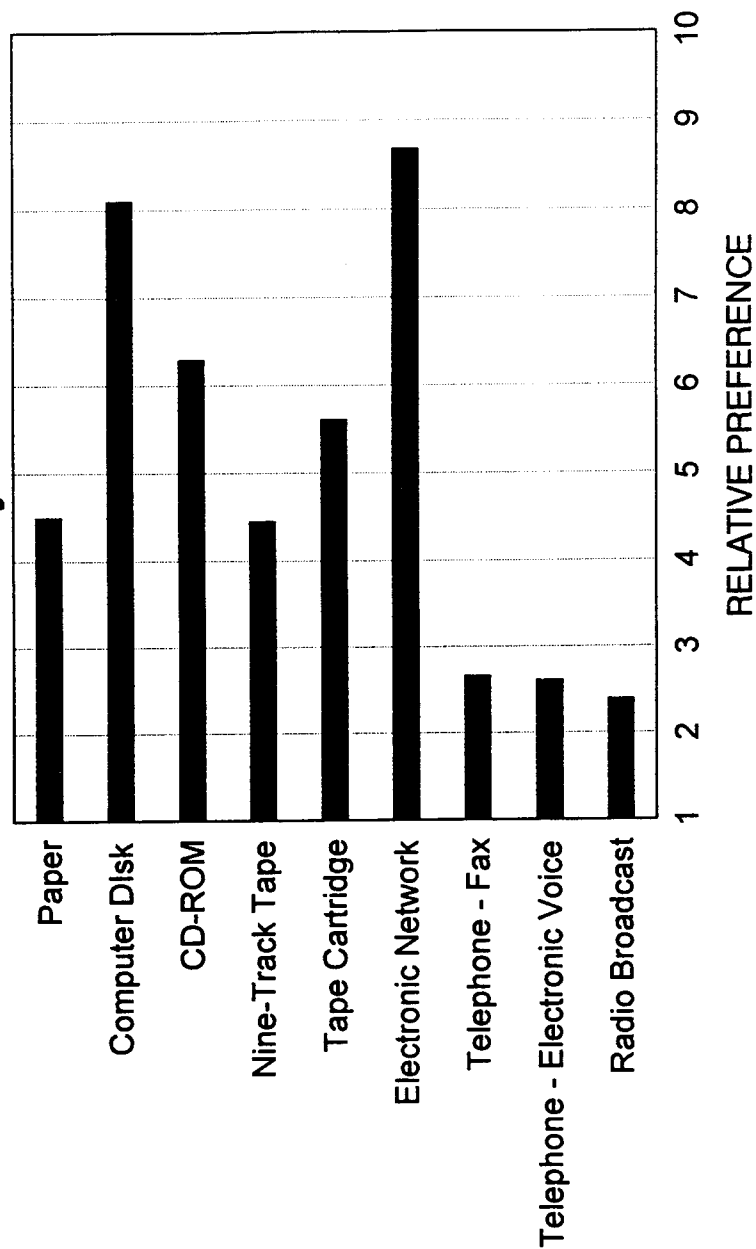
## Preferred Schedule for Products



Corps of Engineers, CERC

# WAVE DATA USERS' NEEDS SURVEY

## Preferred Delivery Medium

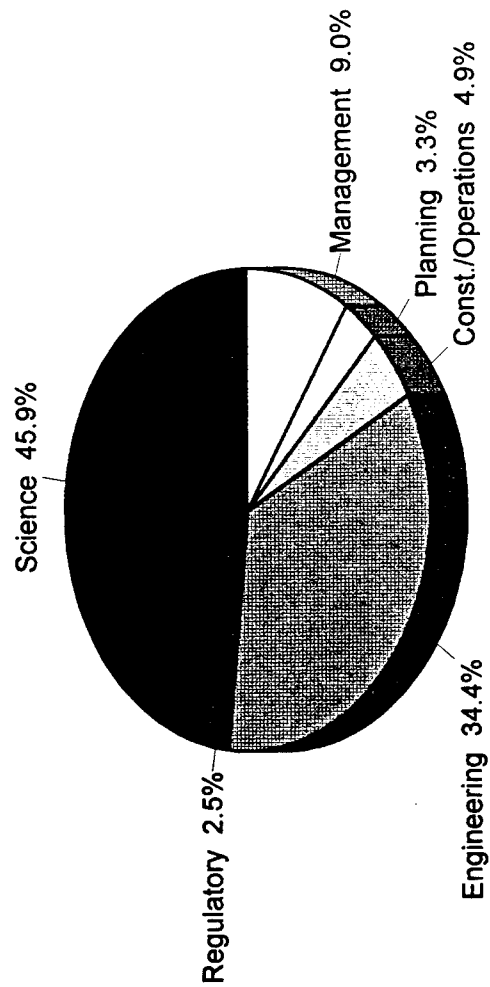


Corps of Engineers, CERC

## **Non-Corps Respondents**

# WAVE DATA USERS' NEEDS SURVEY

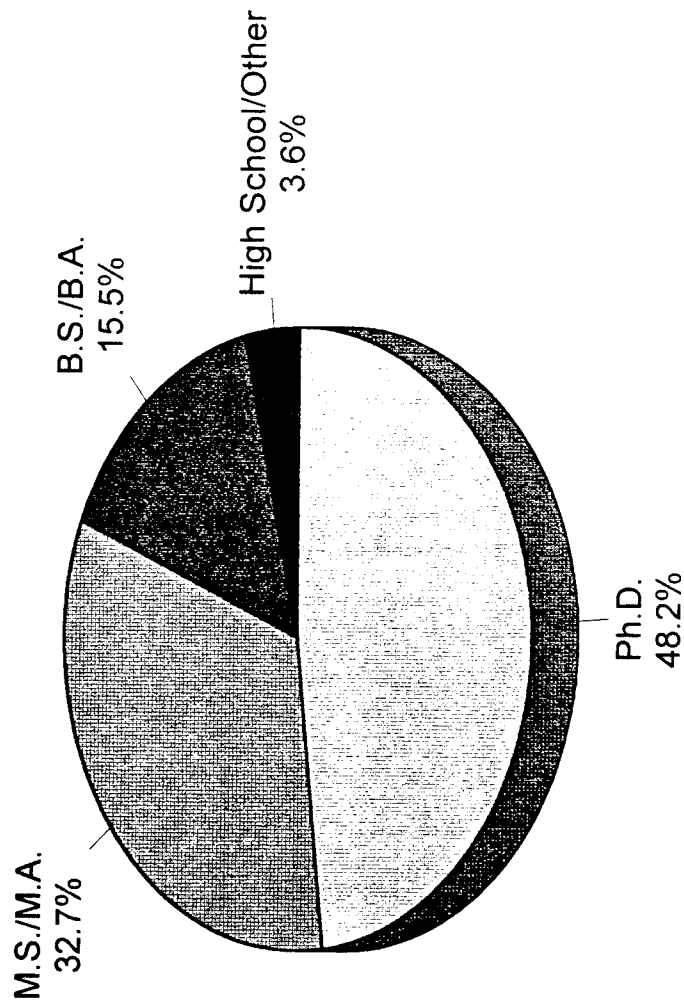
## Primary Field of Work



Not Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

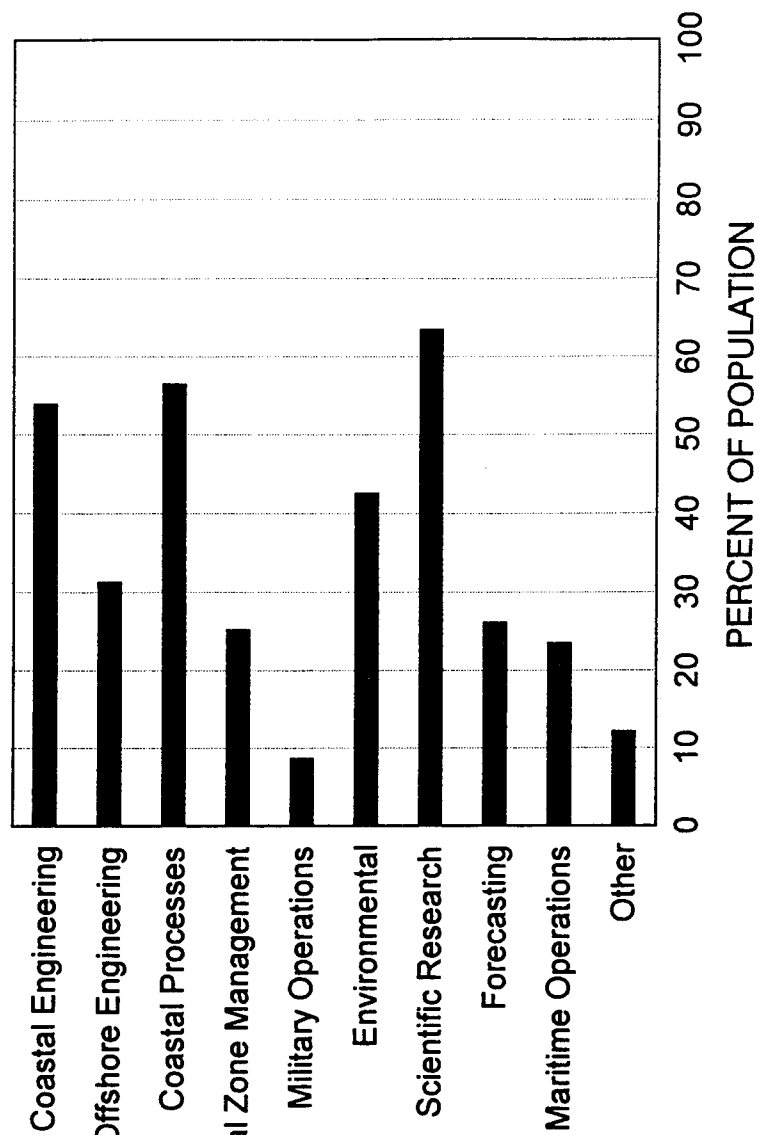
## Highest Degree Obtained



Not Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

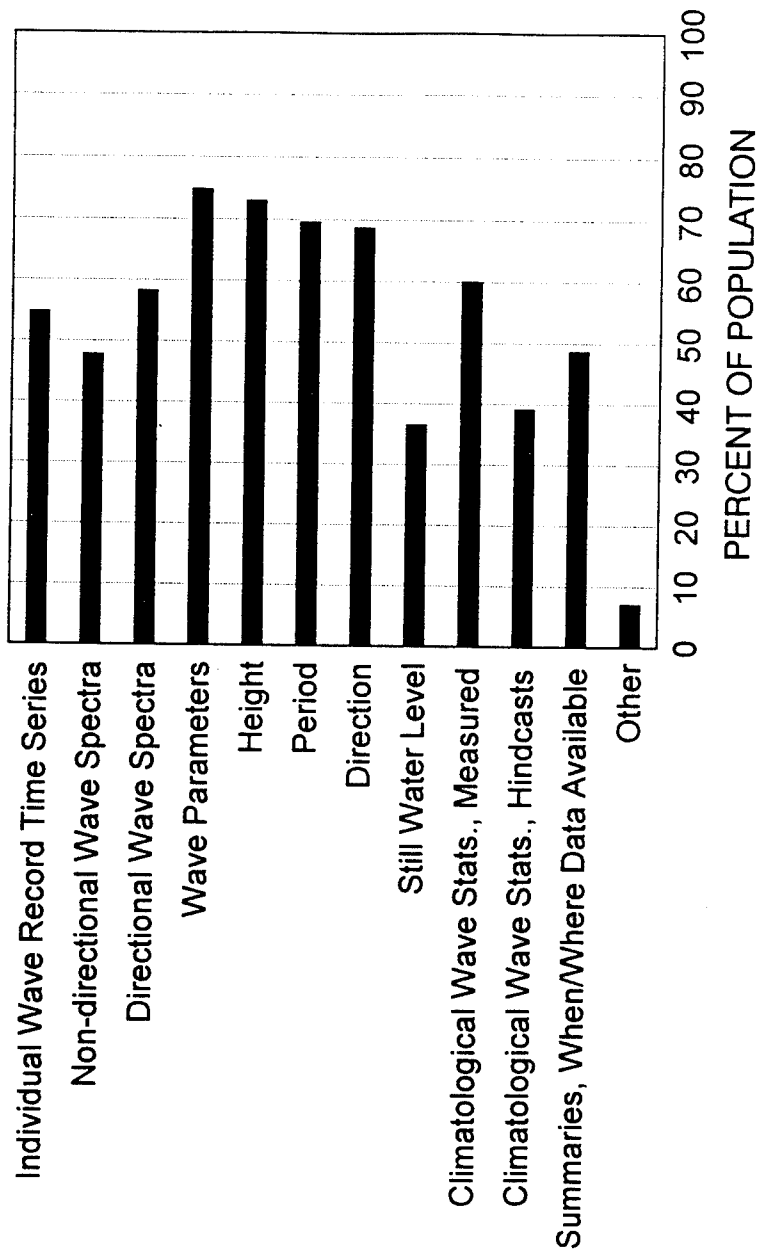
## Applications of Wave Data and Products



Not Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

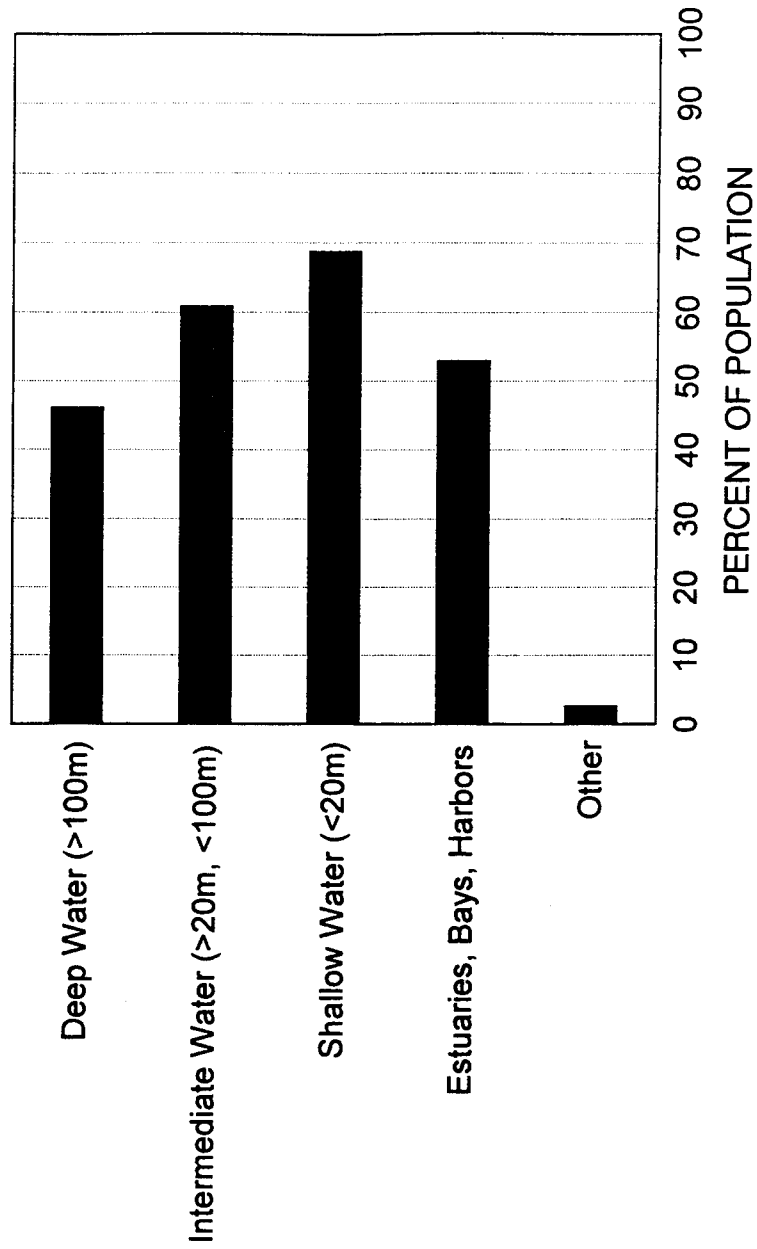
## Wave Data and Products Used



Not Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

## Locations of Needed Wave Data

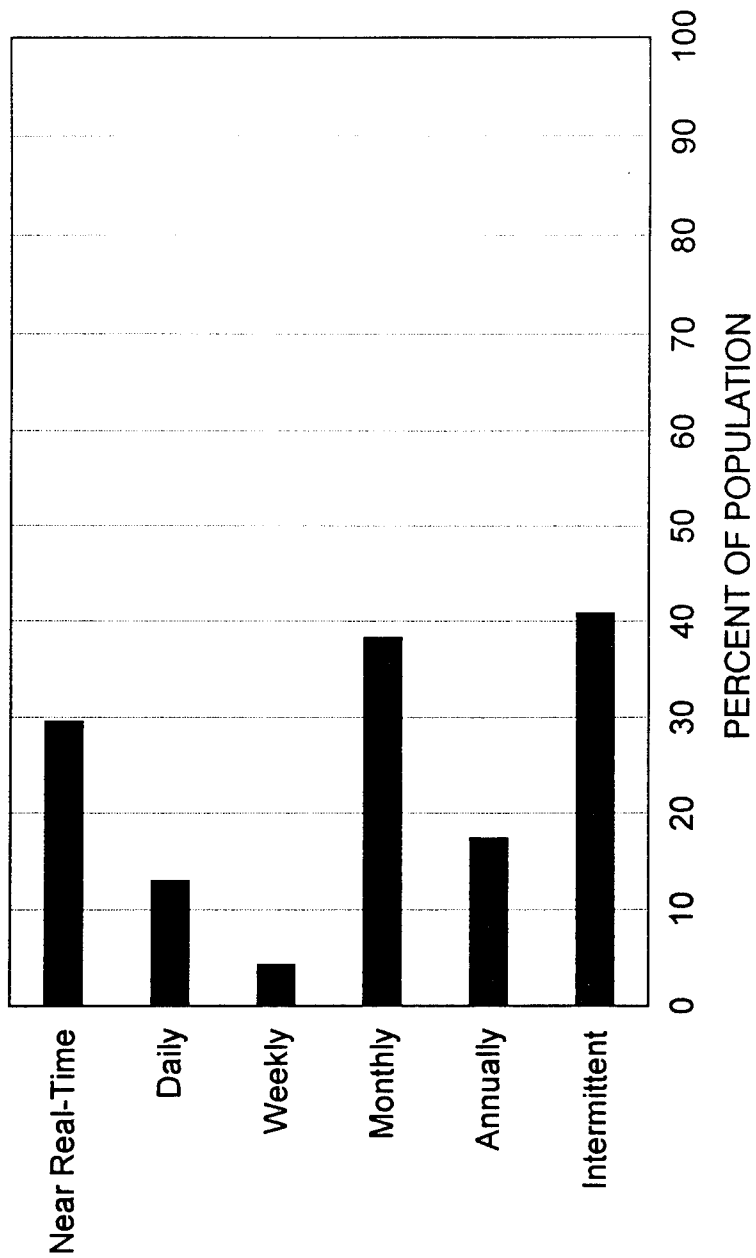


Not Corps of Engineers



# WAVE DATA USERS' NEEDS SURVEY

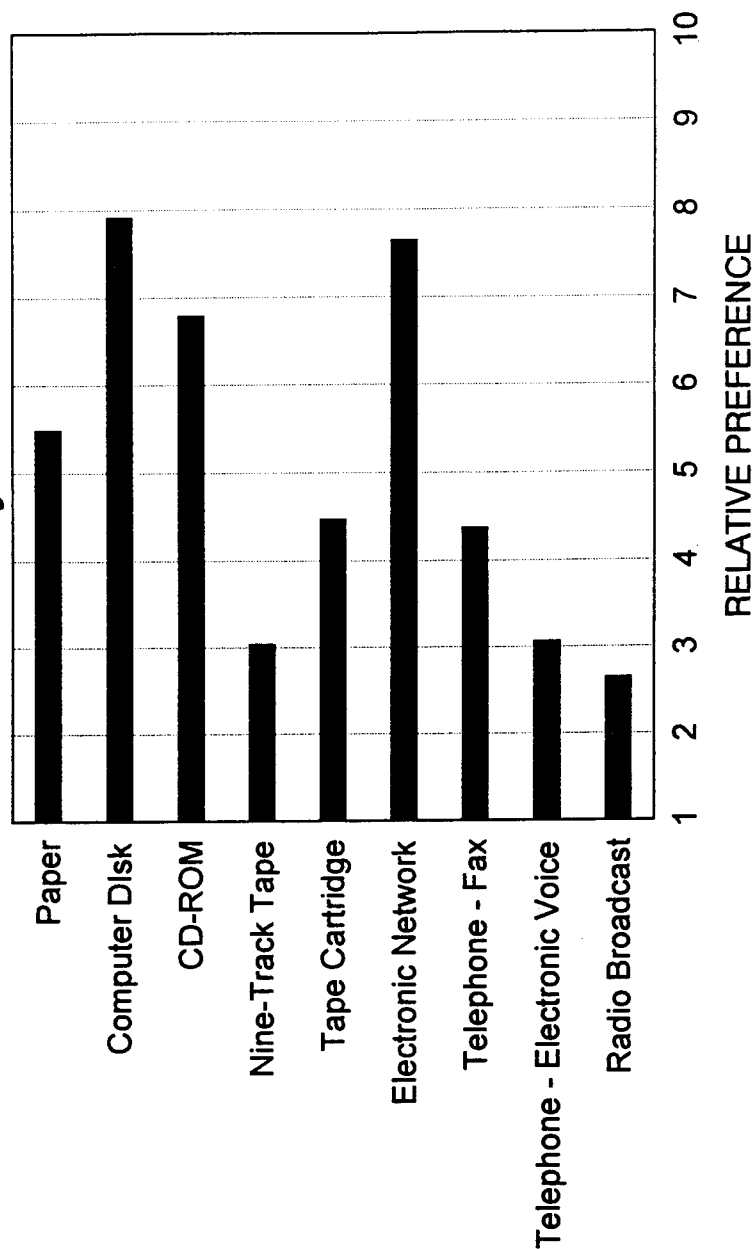
## Preferred Schedule for Products



Not Corps of Engineers

# WAVE DATA USERS' NEEDS SURVEY

## Preferred Delivery Medium



Not Corps of Engineers

# **Appendix C**

## **Tabulated Reports of Results**

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## **Total Population**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: COMPOSITE (212 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
HIGHEST DEGREE OBTAINED			
High School/Other	5	2.4%	2.4%
B.S./B.A.	48	22.6%	23.2%
M.S./M.A.	90	42.5%	43.5%
Ph.D.	64	30.2%	30.9%
Total:	207		
PRIMARY FIELD OF WORK			
Science	71	33.5%	30.6%
Engineering	120	56.6%	51.7%
Construction/Operations	11	5.2%	4.7%
Planning	14	6.6%	6.0%
Management	12	5.7%	5.2%
Regulatory	4	1.9%	1.7%
Total:	232		
ORGANIZATIONAL AFFILIATION			
Corps of Engineers	97	45.8%	48.0%
Other Federal Government	23	10.8%	11.4%
State/Local Government	13	6.1%	6.4%
Private	27	12.7%	13.4%
University/Academia	36	17.0%	17.8%
Other (specify)	6	2.8%	3.0%
Total:	202		
APPLICATION(S) OF WAVE DATA AND PRODUCTS			
Coastal Engineering	150	70.8%	21.8%
Ocean/Offshore Engineering	46	21.7%	6.7%
Coastal Processes	138	65.1%	20.1%
Coastal Zone Management	49	23.1%	7.1%
Military Operations	19	9.0%	2.8%
Environmental (e.g., Water Quality)	67	31.6%	9.7%
Scientific Research	113	53.3%	16.4%
Forecasting	46	21.7%	6.7%
Maritime Operations	37	17.5%	5.4%
Other (specify)	23	10.8%	3.3%
Total:	688		
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED			
Individual Wave Record Time Series	120	56.6%	8.5%
Non-directional Wave Spectra	97	45.8%	6.9%
Directional Wave Spectra	121	57.1%	8.6%
Wave Parameters	169	79.7%	11.9%
Height	166	78.3%	11.7%

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FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: COMPOSITE (212 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
Period	162	76.4%	11.4%
Direction	155	73.1%	11.0%
Still Water Level (mean depth during wave measurement)	92	43.4%	6.5%
Climatological Wave Statistics Based on Measured Data	116	54.7%	8.2%
Climatological Wave Statistics Based on Hindcasts	96	45.3%	6.8%
Summaries Showing When/Where Measured Data Available	102	48.1%	7.2%
Other (specify)	19	9.0%	1.3%
Total:	1415		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	82	38.7%	16.3%
Intermediate Water (>20m, <100m)	123	58.0%	24.5%
Shallow Water (<20m)	167	78.8%	33.3%
Estuaries, Bays, Harbors	120	56.6%	23.9%
Other (specify)	10	4.7%	2.0%
Total:	502		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	66	31.1%	20.6%
Daily	22	10.4%	6.9%
Weekly	6	2.8%	1.9%
Monthly	89	42.0%	27.7%
Annually	55	25.9%	17.1%
Intermittent	83	39.2%	25.9%
Total:	321		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	191	90.1%	5.69
Computer Disk	195	92.0%	8.24
CD-ROM	176	83.0%	6.65
Nine-track (reel) Tape	164	77.4%	3.03
Tape Cartridge (e.g., DAT, QIC)	167	78.8%	4.49
Electronic Network	185	87.3%	7.82
Telephone - Fax	167	78.8%	4.23
Telephone - Electronic Voice	158	74.5%	3.08
Radio Broadcast	159	75.0%	2.57
Total:	1562		

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## **Corps Respondents**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: CORPS OF ENGINEERS (97 responses)

Page: 1

SURVEY ITEM	RESPONSES		
	COUNT	% BASIS	AVG. VALUE
HIGHEST DEGREE OBTAINED			
High School/Other	1	1.0%	1.0%
B.S./B.A.	31	32.0%	32.0%
M.S./M.A.	54	55.7%	55.7%
Ph.D.	11	11.3%	11.3%
Total:	97		
PRIMARY FIELD OF WORK			
Science	15	15.5%	13.6%
Engineering	78	80.4%	70.9%
Construction/Operations	5	5.2%	4.5%
Planning	10	10.3%	9.1%
Management	1	1.0%	0.9%
Regulatory	1	1.0%	0.9%
Total:	110		
ORGANIZATIONAL AFFILIATION			
Corps of Engineers	97	100.0%	100.0%
Other Federal Government	0	0.0%	0.0%
State/Local Government	0	0.0%	0.0%
Private	0	0.0%	0.0%
University/Academia	0	0.0%	0.0%
Other (specify)	0	0.0%	0.0%
Total:	97		
APPLICATION(S) OF WAVE DATA AND PRODUCTS			
Coastal Engineering	88	90.7%	30.0%
Ocean/Offshore Engineering	10	10.3%	3.4%
Coastal Processes	73	75.3%	24.9%
Coastal Zone Management	20	20.6%	6.8%
Military Operations	9	9.3%	3.1%
Environmental (e.g., Water Quality)	18	18.6%	6.1%
Scientific Research	40	41.2%	13.7%
Forecasting	16	16.5%	5.5%
Maritime Operations	10	10.3%	3.4%
Other (specify)	9	9.3%	3.1%
Total:	293		
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED			
Individual Wave Record Time Series	57	58.8%	8.4%
Non-directional Wave Spectra	42	43.3%	6.2%
Directional Wave Spectra	54	55.7%	7.9%
Wave Parameters	83	85.6%	12.2%
Height	82	84.5%	12.0%

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FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: CORPS OF ENGINEERS (97 responses)

Page: 2

SURVEY ITEM	RESPONSES		
	COUNT	% BASIS	AVG. VALUE
Period	82	84.5%	12.0%
Direction	76	78.4%	11.2%
Still Water Level (mean depth during wave measurement)	50	51.5%	7.3%
Climatological Wave Statistics Based on Measured Data	47	48.5%	6.9%
Climatological Wave Statistics Based on Hindcasts	51	52.6%	7.5%
Summaries Showing When/Where Measured Data Available	46	47.4%	6.8%
Other (specify)	11	11.3%	1.6%
Total:	681		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	29	29.9%	12.3%
Intermediate Water (>20m, <100m)	53	54.6%	22.5%
Shallow Water (<20m)	88	90.7%	37.3%
Estuaries, Bays, Harbors	59	60.8%	25.0%
Other (specify)	7	7.2%	3.0%
Total:	236		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	32	33.0%	20.5%
Daily	7	7.2%	4.5%
Weekly	1	1.0%	0.6%
Monthly	45	46.4%	28.8%
Annually	35	36.1%	22.4%
Intermittent	36	37.1%	23.1%
Total:	156		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	89	91.8%	5.92
Computer Disk	93	95.9%	8.59
CD-ROM	85	87.6%	6.49
Nine-track (reel) Tape	80	82.5%	3.03
Tape Cartridge (e.g., DAT, QIC)	79	81.4%	4.52
Electronic Network	88	90.7%	8.00
Telephone - Fax	78	80.4%	4.06
Telephone - Electronic Voice	77	79.4%	3.09
Radio Broadcast	77	79.4%	2.49
Total:	746		

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## **Corps Respondents (Not CERC)**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: CORPS OF ENGINEERS, NOT CERC (55 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	0	0.0%	0.0%	
B.S./B.A.	21	38.2%	38.2%	
M.S./M.A.	31	56.4%	56.4%	
Ph.D.	3	5.5%	5.5%	
Total:	55			
PRIMARY FIELD OF WORK				
Science	2	3.6%	3.2%	
Engineering	47	85.5%	74.6%	
Construction/Operations	4	7.3%	6.3%	
Planning	9	16.4%	14.3%	
Management	1	1.8%	1.6%	
Regulatory	0	0.0%	0.0%	
Total:	63			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	55	100.0%	100.0%	
Other Federal Government	0	0.0%	0.0%	
State/Local Government	0	0.0%	0.0%	
Private	0	0.0%	0.0%	
University/Academia	0	0.0%	0.0%	
Other (specify)	0	0.0%	0.0%	
Total:	55			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	51	92.7%	32.3%	
Ocean/Offshore Engineering	5	9.1%	3.2%	
Coastal Processes	41	74.5%	25.9%	
Coastal Zone Management	14	25.5%	8.9%	
Military Operations	1	1.8%	0.6%	
Environmental (e.g., Water Quality)	13	23.6%	8.2%	
Scientific Research	8	14.5%	5.1%	
Forecasting	10	18.2%	6.3%	
Maritime Operations	8	14.5%	5.1%	
Other (specify)	7	12.7%	4.4%	
Total:	158			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	30	54.5%	7.9%	
Non-directional Wave Spectra	19	34.5%	5.0%	
Directional Wave Spectra	27	49.1%	7.1%	
Wave Parameters	47	85.5%	12.4%	
Height	46	83.6%	12.2%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: CORPS OF ENGINEERS, NOT CERC (55 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
Period	46	83.6%	12.2%	
Direction	41	74.5%	10.8%	
Still Water Level (mean depth during wave measurement)	29	52.7%	7.7%	
Climatological Wave Statistics Based on Measured Data	27	49.1%	7.1%	
Climatological Wave Statistics Based on Hindcasts	33	60.0%	8.7%	
Summaries Showing When/Where Measured Data Available	26	47.3%	6.9%	
Other (specify)	7	12.7%	1.9%	
Total:	378			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	17	30.9%	12.8%	
Intermediate Water (>20m, <100m)	26	47.3%	19.5%	
Shallow Water (<20m)	50	90.9%	37.6%	
Estuaries, Bays, Harbors	35	63.6%	26.3%	
Other (specify)	5	9.1%	3.8%	
Total:	133			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	23	41.8%	24.0%	
Daily	3	5.5%	3.1%	
Weekly	1	1.8%	1.0%	
Monthly	25	45.5%	26.0%	
Annually	22	40.0%	22.9%	
Intermittent	22	40.0%	22.9%	
Total:	96			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	52	94.5%		6.94
Computer Disk	53	96.4%		8.96
CD-ROM	50	90.9%		6.64
Nine-track (reel) Tape	47	85.5%		2.02
Tape Cartridge (e.g., DAT, QIC)	46	83.6%		3.74
Electronic Network	51	92.7%		7.51
Telephone - Fax	46	83.6%		5.04
Telephone - Electronic Voice	46	83.6%		3.41
Radio Broadcast	46	83.6%		2.57
Total:	437			

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## **CERC Respondents**

## **Non-Corps Respondents**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: NOT CORPS OF ENGINEERS (115 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	4	3.5%	3.6%	
B.S./B.A.	17	14.8%	15.5%	
M.S./M.A.	36	31.3%	32.7%	
Ph.D.	53	46.1%	48.2%	
Total:	110			
PRIMARY FIELD OF WORK				
Science	56	48.7%	45.9%	
Engineering	42	36.5%	34.4%	
Construction/Operations	6	5.2%	4.9%	
Planning	4	3.5%	3.3%	
Management	11	9.6%	9.0%	
Regulatory	3	2.6%	2.5%	
Total:	122			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	0	0.0%	0.0%	
Other Federal Government	23	20.0%	21.9%	
State/Local Government	13	11.3%	12.4%	
Private	27	23.5%	25.7%	
University/Academia	36	31.3%	34.3%	
Other (specify)	6	5.2%	5.7%	
Total:	105			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	62	53.9%	15.7%	
Ocean/Offshore Engineering	36	31.3%	9.1%	
Coastal Processes	65	56.5%	16.5%	
Coastal Zone Management	29	25.2%	7.3%	
Military Operations	10	8.7%	2.5%	
Environmental (e.g., Water Quality)	49	42.6%	12.4%	
Scientific Research	73	63.5%	18.5%	
Forecasting	30	26.1%	7.6%	
Maritime Operations	27	23.5%	6.8%	
Other (specify)	14	12.2%	3.5%	
Total:	395			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	63	54.8%	8.6%	
Non-directional Wave Spectra	55	47.8%	7.5%	
Directional Wave Spectra	67	58.3%	9.1%	
Wave Parameters	86	74.8%	11.7%	
Height	84	73.0%	11.4%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: NOT CORPS OF ENGINEERS (115 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
Period	80	69.6%	10.9%
Direction	79	68.7%	10.8%
Still Water Level (mean depth during wave measurement)	42	36.5%	5.7%
Climatological Wave Statistics Based on Measured Data	69	60.0%	9.4%
Climatological Wave Statistics Based on Hindcasts	45	39.1%	6.1%
Summaries Showing When/Where Measured Data Available	56	48.7%	7.6%
Other (specify)	8	7.0%	1.1%
Total:	734		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	53	46.1%	19.9%
Intermediate Water (>20m, <100m)	70	60.9%	26.3%
Shallow Water (<20m)	79	68.7%	29.7%
Estuaries, Bays, Harbors	61	53.0%	22.9%
Other (specify)	3	2.6%	1.1%
Total:	266		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	34	29.6%	20.6%
Daily	15	13.0%	9.1%
Weekly	5	4.3%	3.0%
Monthly	44	38.3%	26.7%
Annually	20	17.4%	12.1%
Intermittent	47	40.9%	28.5%
Total:	165		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	102	88.7%	5.49
Computer Disk	102	88.7%	7.92
CD-ROM	91	79.1%	6.79
Nine-track (reel) Tape	84	73.0%	3.04
Tape Cartridge (e.g., DAT, QIC)	88	76.5%	4.47
Electronic Network	97	84.3%	7.65
Telephone - Fax	89	77.4%	4.37
Telephone - Electronic Voice	81	70.4%	3.07
Radio Broadcast	82	71.3%	2.65
Total:	816		

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## **University/Academia Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: UNIVERSITY/ACADEMIA (36 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	POP. QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	0	0.0%	0.0%	
B.S./B.A.	2	5.6%	5.6%	
M.S./M.A.	4	11.1%	11.1%	
Ph.D.	30	83.3%	83.3%	
Total:	36			
PRIMARY FIELD OF WORK				
Science	23	63.9%	62.2%	
Engineering	13	36.1%	35.1%	
Construction/Operations	0	0.0%	0.0%	
Planning	0	0.0%	0.0%	
Management	1	2.8%	2.7%	
Regulatory	0	0.0%	0.0%	
Total:	37			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	0	0.0%	0.0%	
Other Federal Government	1	2.8%	2.3%	
State/Local Government	1	2.8%	2.3%	
Private	3	8.3%	7.0%	
University/Academia	36	100.0%	83.7%	
Other (specify)	2	5.6%	4.7%	
Total:	43			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	27	75.0%	18.9%	
Ocean/Offshore Engineering	11	30.6%	7.7%	
Coastal Processes	31	86.1%	21.7%	
Coastal Zone Management	11	30.6%	7.7%	
Military Operations	0	0.0%	0.0%	
Environmental (e.g., Water Quality)	17	47.2%	11.9%	
Scientific Research	32	88.9%	22.4%	
Forecasting	5	13.9%	3.5%	
Maritime Operations	3	8.3%	2.1%	
Other (specify)	6	16.7%	4.2%	
Total:	143			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	26	72.2%	10.7%	
Non-directional Wave Spectra	16	44.4%	6.6%	
Directional Wave Spectra	20	55.6%	8.3%	
Wave Parameters	28	77.8%	11.6%	
Height	26	72.2%	10.7%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: UNIVERSITY/ACADEMIA (36 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
Period	26	72.2%	10.7%	
Direction	25	69.4%	10.3%	
Still Water Level (mean depth during wave measurement)	16	44.4%	6.6%	
Climatological Wave Statistics Based on Measured Data	21	58.3%	8.7%	
Climatological Wave Statistics Based on Hindcasts	14	38.9%	5.8%	
Summaries Showing When/Where Measured Data Available	20	55.6%	8.3%	
Other (specify)	4	11.1%	1.7%	
Total:	242			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	14	38.9%	16.3%	
Intermediate Water (>20m, <100m)	23	63.9%	26.7%	
Shallow Water (<20m)	28	77.8%	32.6%	
Estuaries, Bays, Harbors	20	55.6%	23.3%	
Other (specify)	1	2.8%	1.2%	
Total:	86			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	10	27.8%	19.6%	
Daily	5	13.9%	9.8%	
Weekly	2	5.6%	3.9%	
Monthly	16	44.4%	31.4%	
Annually	7	19.4%	13.7%	
Intermittent	11	30.6%	21.6%	
Total:	51			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	33	91.7%		5.45
Computer Disk	32	88.9%		8.22
CD-ROM	29	80.6%		7.45
Nine-track (reel) Tape	25	69.4%		3.08
Tape Cartridge (e.g., DAT, QIC)	27	75.0%		5.67
Electronic Network	29	80.6%		8.17
Telephone - Fax	25	69.4%		3.36
Telephone - Electronic Voice	24	66.7%		2.17
Radio Broadcast	24	66.7%		2.00
Total:	248			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Private Sector Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: PRIVATE (27 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	1	3.7%	3.8%	
B.S./B.A.	5	18.5%	19.2%	
M.S./M.A.	10	37.0%	38.5%	
Ph.D.	10	37.0%	38.5%	
Total:	26			
PRIMARY FIELD OF WORK				
Science	12	44.4%	41.4%	
Engineering	15	55.6%	51.7%	
Construction/Operations	1	3.7%	3.4%	
Planning	0	0.0%	0.0%	
Management	1	3.7%	3.4%	
Regulatory	0	0.0%	0.0%	
Total:	29			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	0	0.0%	0.0%	
Other Federal Government	0	0.0%	0.0%	
State/Local Government	0	0.0%	0.0%	
Private	27	100.0%	90.0%	
University/Academia	3	11.1%	10.0%	
Other (specify)	0	0.0%	0.0%	
Total:	30			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	16	59.3%	15.1%	
Ocean/Offshore Engineering	15	55.6%	14.2%	
Coastal Processes	14	51.9%	13.2%	
Coastal Zone Management	6	22.2%	5.7%	
Military Operations	3	11.1%	2.8%	
Environmental (e.g., Water Quality)	12	44.4%	11.3%	
Scientific Research	14	51.9%	13.2%	
Forecasting	10	37.0%	9.4%	
Maritime Operations	11	40.7%	10.4%	
Other (specify)	5	18.5%	4.7%	
Total:	106			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	13	48.1%	6.8%	
Non-directional Wave Spectra	16	59.3%	8.3%	
Directional Wave Spectra	18	66.7%	9.4%	
Wave Parameters	22	81.5%	11.5%	
Height	22	81.5%	11.5%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: PRIVATE (27 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
Period	21	77.8%	10.9%
Direction	20	74.1%	10.4%
Still Water Level (mean depth during wave measurement)	11	40.7%	5.7%
Climatological Wave Statistics Based on Measured Data	19	70.4%	9.9%
Climatological Wave Statistics Based on Hindcasts	15	55.6%	7.8%
Summaries Showing When/Where Measured Data Available	14	51.9%	7.3%
Other (specify)	1	3.7%	0.5%
Total:	192		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	15	55.6%	22.7%
Intermediate Water (>20m, <100m)	18	66.7%	27.3%
Shallow Water (<20m)	20	74.1%	30.3%
Estuaries, Bays, Harbors	13	48.1%	19.7%
Other (specify)	0	0.0%	0.0%
Total:	66		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	7	25.9%	17.5%
Daily	1	3.7%	2.5%
Weekly	2	7.4%	5.0%
Monthly	10	37.0%	25.0%
Annually	5	18.5%	12.5%
Intermittent	15	55.6%	37.5%
Total:	40		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	25	92.6%	6.16
Computer Disk	24	88.9%	8.58
CD-ROM	21	77.8%	7.38
Nine-track (reel) Tape	20	74.1%	3.30
Tape Cartridge (e.g., DAT, QIC)	21	77.8%	4.48
Electronic Network	21	77.8%	7.05
Telephone - Fax	23	85.2%	4.96
Telephone - Electronic Voice	21	77.8%	3.86
Radio Broadcast	21	77.8%	3.19
Total:	197		

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## **Non-Corps Federal Respondents**

## **State/Local Government Respondents**



FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: STATE/LOCAL GOVERNMENT (13 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	% BASIS QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	1	7.7%	7.7%	
B.S./B.A.	2	15.4%	15.4%	
M.S./M.A.	8	61.5%	61.5%	
Ph.D.	2	15.4%	15.4%	
Total:	13			
PRIMARY FIELD OF WORK				
Science	7	53.8%	36.8%	
Engineering	3	23.1%	15.8%	
Construction/Operations	2	15.4%	10.5%	
Planning	2	15.4%	10.5%	
Management	3	23.1%	15.8%	
Regulatory	2	15.4%	10.5%	
Total:	19			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	0	0.0%	0.0%	
Other Federal Government	0	0.0%	0.0%	
State/Local Government	13	100.0%	92.9%	
Private	0	0.0%	0.0%	
University/Academia	1	7.7%	7.1%	
Other (specify)	0	0.0%	0.0%	
Total:	14			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	8	61.5%	17.4%	
Ocean/Offshore Engineering	0	0.0%	0.0%	
Coastal Processes	10	76.9%	21.7%	
Coastal Zone Management	9	69.2%	19.6%	
Military Operations	0	0.0%	0.0%	
Environmental (e.g., Water Quality)	8	61.5%	17.4%	
Scientific Research	8	61.5%	17.4%	
Forecasting	1	7.7%	2.2%	
Maritime Operations	2	15.4%	4.3%	
Other (specify)	0	0.0%	0.0%	
Total:	46			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	2	15.4%	4.5%	
Non-directional Wave Spectra	2	15.4%	4.5%	
Directional Wave Spectra	4	30.8%	9.1%	
Wave Parameters	5	38.5%	11.4%	
Height	5	38.5%	11.4%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: STATE/LOCAL GOVERNMENT (13 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% POP.	% BASIS QUES.	
Period	5	38.5%	11.4%	
Direction	5	38.5%	11.4%	
Still Water Level (mean depth during wave measurement)	2	15.4%	4.5%	
Climatological Wave Statistics Based on Measured Data	6	46.2%	13.6%	
Climatological Wave Statistics Based on Hindcasts	4	30.8%	9.1%	
Summaries Showing When/Where Measured Data Available	3	23.1%	6.8%	
Other (specify)	1	7.7%	2.3%	
Total:	44			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	2	15.4%	7.7%	
Intermediate Water (>20m, <100m)	3	23.1%	11.5%	
Shallow Water (<20m)	10	76.9%	38.5%	
Estuaries, Bays, Harbors	11	84.6%	42.3%	
Other (specify)	0	0.0%	0.0%	
Total:	26			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	4	30.8%	21.1%	
Daily	4	30.8%	21.1%	
Weekly	0	0.0%	0.0%	
Monthly	5	38.5%	26.3%	
Annually	1	7.7%	5.3%	
Intermittent	5	38.5%	26.3%	
Total:	19			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	11	84.6%		5.09
Computer Disk	13	100.0%		8.69
CD-ROM	8	61.5%		5.50
Nine-track (reel) Tape	7	53.8%		1.57
Tape Cartridge (e.g., DAT, QIC)	7	53.8%		3.14
Electronic Network	12	92.3%		7.17
Telephone - Fax	9	69.2%		4.33
Telephone - Electronic Voice	7	53.8%		3.14
Radio Broadcast	7	53.8%		2.14
Total:	81			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Other Affiliation Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: OTHER AFFILIATION (6 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	POP. QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	0	0.0%	0.0%	
B.S./B.A.	0	0.0%	0.0%	
M.S./M.A.	2	33.3%	40.0%	
Ph.D.	3	50.0%	60.0%	
Total:	5			
PRIMARY FIELD OF WORK				
Science	5	83.3%	100.0%	
Engineering	0	0.0%	0.0%	
Construction/Operations	0	0.0%	0.0%	
Planning	0	0.0%	0.0%	
Management	0	0.0%	0.0%	
Regulatory	0	0.0%	0.0%	
Total:	5			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	0	0.0%	0.0%	
Other Federal Government	0	0.0%	0.0%	
State/Local Government	0	0.0%	0.0%	
Private	0	0.0%	0.0%	
University/Academia	2	33.3%	25.0%	
Other (specify)	6	100.0%	75.0%	
Total:	8			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	1	16.7%	5.9%	
Ocean/Offshore Engineering	1	16.7%	5.9%	
Coastal Processes	1	16.7%	5.9%	
Coastal Zone Management	1	16.7%	5.9%	
Military Operations	1	16.7%	5.9%	
Environmental (e.g., Water Quality)	4	66.7%	23.5%	
Scientific Research	4	66.7%	23.5%	
Forecasting	2	33.3%	11.8%	
Maritime Operations	1	16.7%	5.9%	
Other (specify)	1	16.7%	5.9%	
Total:	17			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	4	66.7%	12.9%	
Non-directional Wave Spectra	3	50.0%	9.7%	
Directional Wave Spectra	2	33.3%	6.5%	
Wave Parameters	4	66.7%	12.9%	
Height	3	50.0%	9.7%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: OTHER AFFILIATION (6 responses)

Page: 2

SURVEY ITEM	RESPONSES			AVG. VALUE
	COUNT	% BASIS POP.	QUES.	
Period	2	33.3%	6.5%	
Direction	2	33.3%	6.5%	
Still Water Level (mean depth during wave measurement)	0	0.0%	0.0%	
Climatological Wave Statistics Based on Measured Data	4	66.7%	12.9%	
Climatological Wave Statistics Based on Hindcasts	3	50.0%	9.7%	
Summaries Showing When/Where Measured Data Available	3	50.0%	9.7%	
Other (specify)	1	16.7%	3.2%	
Total:	31			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	3	50.0%	33.3%	
Intermediate Water (>20m, <100m)	2	33.3%	22.2%	
Shallow Water (<20m)	1	16.7%	11.1%	
Estuaries, Bays, Harbors	3	50.0%	33.3%	
Other (specify)	0	0.0%	0.0%	
Total:	9			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	2	33.3%	22.2%	
Daily	0	0.0%	0.0%	
Weekly	0	0.0%	0.0%	
Monthly	1	16.7%	11.1%	
Annually	2	33.3%	22.2%	
Intermittent	4	66.7%	44.4%	
Total:	9			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	6	100.0%	4.67	
Computer Disk	6	100.0%	7.50	
CD-ROM	6	100.0%	5.50	
Nine-track (reel) Tape	6	100.0%	2.17	
Tape Cartridge (e.g., DAT, QIC)	5	83.3%	4.00	
Electronic Network	6	100.0%	8.50	
Telephone - Fax	6	100.0%	3.17	
Telephone - Electronic Voice	6	100.0%	1.50	
Radio Broadcast	6	100.0%	1.33	
Total:	53			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Engineering Respondents**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: ENGINEERING (120 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	1	0.8%	0.8%	
B.S./B.A.	33	27.5%	27.7%	
M.S./M.A.	57	47.5%	47.9%	
Ph.D.	28	23.3%	23.5%	
Total:	119			
PRIMARY FIELD OF WORK				
Science	12	10.0%	8.4%	
Engineering	120	100.0%	83.9%	
Construction/Operations	4	3.3%	2.8%	
Planning	3	2.5%	2.1%	
Management	2	1.7%	1.4%	
Regulatory	2	1.7%	1.4%	
Total:	143			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	78	65.0%	67.2%	
Other Federal Government	7	5.8%	6.0%	
State/Local Government	3	2.5%	2.6%	
Private	15	12.5%	12.9%	
University/Academia	13	10.8%	11.2%	
Other (specify)	0	0.0%	0.0%	
Total:	116			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	105	87.5%	26.1%	
Ocean/Offshore Engineering	31	25.8%	7.7%	
Coastal Processes	83	69.2%	20.6%	
Coastal Zone Management	27	22.5%	6.7%	
Military Operations	10	8.3%	2.5%	
Environmental (e.g., Water Quality)	34	28.3%	8.4%	
Scientific Research	59	49.2%	14.6%	
Forecasting	23	19.2%	5.7%	
Maritime Operations	17	14.2%	4.2%	
Other (specify)	14	11.7%	3.5%	
Total:	403			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	65	54.2%	7.9%	
Non-directional Wave Spectra	54	45.0%	6.5%	
Directional Wave Spectra	67	55.8%	8.1%	
Wave Parameters	97	80.8%	11.7%	
Height	96	80.0%	11.6%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: ENGINEERING (120 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
		POP.	QUES.
Period	96	80.0%	11.6%
Direction	88	73.3%	10.6%
Still Water Level (mean depth during wave measurement)	62	51.7%	7.5%
Climatological Wave Statistics Based on Measured Data	68	56.7%	8.2%
Climatological Wave Statistics Based on Hindcasts	64	53.3%	7.7%
Summaries Showing When/Where Measured Data Available	58	48.3%	7.0%
Other (specify)	13	10.8%	1.6%
Total:	828		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	38	31.7%	13.4%
Intermediate Water (>20m, <100m)	67	55.8%	23.6%
Shallow Water (<20m)	100	83.3%	35.2%
Estuaries, Bays, Harbors	70	58.3%	24.6%
Other (specify)	9	7.5%	3.2%
Total:	284		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	39	32.5%	20.0%
Daily	12	10.0%	6.2%
Weekly	3	2.5%	1.5%
Monthly	56	46.7%	28.7%
Annually	41	34.2%	21.0%
Intermittent	44	36.7%	22.6%
Total:	195		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	110	91.7%	6.21
Computer Disk	112	93.3%	8.39
CD-ROM	102	85.0%	6.41
Nine-track (reel) Tape	94	78.3%	3.20
Tape Cartridge (e.g., DAT, QIC)	96	80.0%	4.47
Electronic Network	106	88.3%	7.68
Telephone - Fax	95	79.2%	4.19
Telephone - Electronic Voice	92	76.7%	3.23
Radio Broadcast	92	76.7%	2.77
Total:	899		

Survey Scanning and Analysis by Neptune Sciences, Inc.



## **Science Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: SCIENCE (71 responses)

Page: 1

SURVEY ITEM	RESPONSES		
	COUNT	% BASIS	AVG. VALUE
HIGHEST DEGREE OBTAINED			
High School/Other	1	1.4%	1.4%
B.S./B.A.	5	7.0%	7.0%
M.S./M.A.	25	35.2%	35.2%
Ph.D.	40	56.3%	56.3%
Total:	71		
PRIMARY FIELD OF WORK			
Science	71	100.0%	77.2%
Engineering	12	16.9%	13.0%
Construction/Operations	3	4.2%	3.3%
Planning	2	2.8%	2.2%
Management	3	4.2%	3.3%
Regulatory	1	1.4%	1.1%
Total:	92		
ORGANIZATIONAL AFFILIATION			
Corps of Engineers	15	21.1%	20.3%
Other Federal Government	12	16.9%	16.2%
State/Local Government	7	9.9%	9.5%
Private	12	16.9%	16.2%
University/Academia	23	32.4%	31.1%
Other (specify)	5	7.0%	6.8%
Total:	74		
APPLICATION(S) OF WAVE DATA AND PRODUCTS			
Coastal Engineering	40	56.3%	16.0%
Ocean/Offshore Engineering	18	25.4%	7.2%
Coastal Processes	49	69.0%	19.6%
Coastal Zone Management	20	28.2%	8.0%
Military Operations	6	8.5%	2.4%
Environmental (e.g., Water Quality)	26	36.6%	10.4%
Scientific Research	57	80.3%	22.8%
Forecasting	18	25.4%	7.2%
Maritime Operations	9	12.7%	3.6%
Other (specify)	7	9.9%	2.8%
Total:	250		
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED			
Individual Wave Record Time Series	50	70.4%	9.7%
Non-directional Wave Spectra	42	59.2%	8.2%
Directional Wave Spectra	49	69.0%	9.5%
Wave Parameters	60	84.5%	11.7%
Height	58	81.7%	11.3%

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: SCIENCE (71 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% POP.	% BASIS QUES.	
Period	57	80.3%	11.1%	
Direction	56	78.9%	10.9%	
Still Water Level (mean depth during wave measurement)	31	43.7%	6.0%	
Climatological Wave Statistics Based on Measured Data	42	59.2%	8.2%	
Climatological Wave Statistics Based on Hindcasts	23	32.4%	4.5%	
Summaries Showing When/Where Measured Data Available	39	54.9%	7.6%	
Other (specify)	7	9.9%	1.4%	
Total:	514			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	35	49.3%	20.2%	
Intermediate Water (>20m, <100m)	43	60.6%	24.9%	
Shallow Water (<20m)	53	74.6%	30.6%	
Estuaries, Bays, Harbors	39	54.9%	22.5%	
Other (specify)	3	4.2%	1.7%	
Total:	173			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	26	36.6%	23.6%	
Daily	8	11.3%	7.3%	
Weekly	3	4.2%	2.7%	
Monthly	27	38.0%	24.5%	
Annually	15	21.1%	13.6%	
Intermittent	31	43.7%	28.2%	
Total:	110			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	66	93.0%		4.58
Computer Disk	65	91.5%		7.88
CD-ROM	60	84.5%		7.32
Nine-track (reel) Tape	55	77.5%		3.27
Tape Cartridge (e.g., DAT, QIC)	56	78.9%		5.27
Electronic Network	62	87.3%		8.44
Telephone - Fax	55	77.5%		3.49
Telephone - Electronic Voice	51	71.8%		2.53
Radio Broadcast	52	73.2%		2.33
Total:	522			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Planning Respondents**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: PLANNING (14 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	0	0.0%	0.0%	
B.S./B.A.	5	35.7%	38.5%	
M.S./M.A.	7	50.0%	53.8%	
Ph.D.	1	7.1%	7.7%	
Total:	13			
PRIMARY FIELD OF WORK				
Science	2	14.3%	9.5%	
Engineering	3	21.4%	14.3%	
Construction/Operations	1	7.1%	4.8%	
Planning	14	100.0%	66.7%	
Management	1	7.1%	4.8%	
Regulatory	0	0.0%	0.0%	
Total:	21			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	10	71.4%	76.9%	
Other Federal Government	1	7.1%	7.7%	
State/Local Government	2	14.3%	15.4%	
Private	0	0.0%	0.0%	
University/Academia	0	0.0%	0.0%	
Other (specify)	0	0.0%	0.0%	
Total:	13			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	13	92.9%	28.3%	
Ocean/Offshore Engineering	1	7.1%	2.2%	
Coastal Processes	12	85.7%	26.1%	
Coastal Zone Management	7	50.0%	15.2%	
Military Operations	1	7.1%	2.2%	
Environmental (e.g., Water Quality)	3	21.4%	6.5%	
Scientific Research	3	21.4%	6.5%	
Forecasting	3	21.4%	6.5%	
Maritime Operations	3	21.4%	6.5%	
Other (specify)	0	0.0%	0.0%	
Total:	46			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	8	57.1%	7.8%	
Non-directional Wave Spectra	5	35.7%	4.9%	
Directional Wave Spectra	8	57.1%	7.8%	
Wave Parameters	12	85.7%	11.7%	
Height	12	85.7%	11.7%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: PLANNING (14 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% POP.	% BASIS QUES.	
Period	12	85.7%	11.7%	
Direction	12	85.7%	11.7%	
Still Water Level (mean depth during wave measurement)	6	42.9%	5.8%	
Climatological Wave Statistics Based on Measured Data	9	64.3%	8.7%	
Climatological Wave Statistics Based on Hindcasts	10	71.4%	9.7%	
Summaries Showing When/Where Measured Data Available	7	50.0%	6.8%	
Other (specify)	2	14.3%	1.9%	
Total:	103			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	8	57.1%	21.6%	
Intermediate Water (>20m, <100m)	7	50.0%	18.9%	
Shallow Water (<20m)	13	92.9%	35.1%	
Estuaries, Bays, Harbors	8	57.1%	21.6%	
Other (specify)	1	7.1%	2.7%	
Total:	37			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	6	42.9%	19.4%	
Daily	2	14.3%	6.5%	
Weekly	2	14.3%	6.5%	
Monthly	9	64.3%	29.0%	
Annually	5	35.7%	16.1%	
Intermittent	7	50.0%	22.6%	
Total:	31			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	14	100.0%		7.14
Computer Disk	14	100.0%		9.29
CD-ROM	13	92.9%		7.62
Nine-track (reel) Tape	13	92.9%		2.15
Tape Cartridge (e.g., DAT, QIC)	13	92.9%		3.46
Electronic Network	14	100.0%		7.50
Telephone - Fax	14	100.0%		5.79
Telephone - Electronic Voice	13	92.9%		3.92
Radio Broadcast	13	92.9%		2.77
Total:	121			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Management Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: MANAGEMENT (12 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	2	16.7%	16.7%	
B.S./B.A.	2	16.7%	16.7%	
M.S./M.A.	6	50.0%	50.0%	
Ph.D.	2	16.7%	16.7%	
Total:	12			
PRIMARY FIELD OF WORK				
Science	3	25.0%	13.6%	
Engineering	2	16.7%	9.1%	
Construction/Operations	3	25.0%	13.6%	
Planning	1	8.3%	4.5%	
Management	12	100.0%	54.5%	
Regulatory	1	8.3%	4.5%	
Total:	22			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	1	8.3%	10.0%	
Other Federal Government	4	33.3%	40.0%	
State/Local Government	3	25.0%	30.0%	
Private	1	8.3%	10.0%	
University/Academia	1	8.3%	10.0%	
Other (specify)	0	0.0%	0.0%	
Total:	10			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	2	16.7%	6.7%	
Ocean/Offshore Engineering	0	0.0%	0.0%	
Coastal Processes	5	41.7%	16.7%	
Coastal Zone Management	4	33.3%	13.3%	
Military Operations	2	16.7%	6.7%	
Environmental (e.g., Water Quality)	5	41.7%	16.7%	
Scientific Research	4	33.3%	13.3%	
Forecasting	1	8.3%	3.3%	
Maritime Operations	6	50.0%	20.0%	
Other (specify)	1	8.3%	3.3%	
Total:	30			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	3	25.0%	7.7%	
Non-directional Wave Spectra	0	0.0%	0.0%	
Directional Wave Spectra	4	33.3%	10.3%	
Wave Parameters	6	50.0%	15.4%	
Height	6	50.0%	15.4%	

Survey Scanning and Analysis by Neptune Sciences, Inc.



FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: MANAGEMENT (12 responses)

Page: 2

SURVEY ITEM	RESPONSES		
	COUNT	% BASIS POP.	AVG. QUES. VALUE
Period	4	33.3%	10.3%
Direction	6	50.0%	15.4%
Still Water Level (mean depth during wave measurement)	2	16.7%	5.1%
Climatological Wave Statistics Based on Measured Data	4	33.3%	10.3%
Climatological Wave Statistics Based on Hindcasts	1	8.3%	2.6%
Summaries Showing When/Where Measured Data Available	2	16.7%	5.1%
Other (specify)	1	8.3%	2.6%
Total:	39		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	5	41.7%	17.2%
Intermediate Water (>20m, <100m)	6	50.0%	20.7%
Shallow Water (<20m)	8	66.7%	27.6%
Estuaries, Bays, Harbors	9	75.0%	31.0%
Other (specify)	1	8.3%	3.4%
Total:	29		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	2	16.7%	12.5%
Daily	3	25.0%	18.8%
Weekly	1	8.3%	6.3%
Monthly	4	33.3%	25.0%
Annually	1	8.3%	6.3%
Intermittent	5	41.7%	31.3%
Total:	16		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	9	75.0%	5.44
Computer Disk	10	83.3%	7.30
CD-ROM	8	66.7%	3.63
Nine-track (reel) Tape	8	66.7%	1.75
Tape Cartridge (e.g., DAT, QIC)	8	66.7%	2.25
Electronic Network	9	75.0%	6.22
Telephone - Fax	9	75.0%	7.89
Telephone - Electronic Voice	8	66.7%	6.38
Radio Broadcast	8	66.7%	4.50
Total:	77		

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Construction/Operations Respondents**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: REGULATORY (4 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	2	50.0%	40.0%	
B.S./B.A.	0	0.0%	0.0%	
M.S./M.A.	2	50.0%	40.0%	
Ph.D.	1	25.0%	20.0%	
Total:	5			
PRIMARY FIELD OF WORK				
Science	1	25.0%	12.5%	
Engineering	2	50.0%	25.0%	
Construction/Operations	0	0.0%	0.0%	
Planning	0	0.0%	0.0%	
Management	1	25.0%	12.5%	
Regulatory	4	100.0%	50.0%	
Total:	8			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	1	25.0%	25.0%	
Other Federal Government	1	25.0%	25.0%	
State/Local Government	2	50.0%	50.0%	
Private	0	0.0%	0.0%	
University/Academia	0	0.0%	0.0%	
Other (specify)	0	0.0%	0.0%	
Total:	4			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	3	75.0%	25.0%	
Ocean/Offshore Engineering	0	0.0%	0.0%	
Coastal Processes	3	75.0%	25.0%	
Coastal Zone Management	1	25.0%	8.3%	
Military Operations	0	0.0%	0.0%	
Environmental (e.g., Water Quality)	1	25.0%	8.3%	
Scientific Research	3	75.0%	25.0%	
Forecasting	0	0.0%	0.0%	
Maritime Operations	0	0.0%	0.0%	
Other (specify)	1	25.0%	8.3%	
Total:	12			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	2	50.0%	10.0%	
Non-directional Wave Spectra	2	50.0%	10.0%	
Directional Wave Spectra	2	50.0%	10.0%	
Wave Parameters	2	50.0%	10.0%	
Height	2	50.0%	10.0%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: REGULATORY (4 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
Period	2	50.0%	10.0%	
Direction	2	50.0%	10.0%	
Still Water Level (mean depth during wave measurement)	1	25.0%	5.0%	
Climatological Wave Statistics Based on Measured Data	4	100.0%	20.0%	
Climatological Wave Statistics Based on Hindcasts	0	0.0%	0.0%	
Summaries Showing When/Where Measured Data Available	1	25.0%	5.0%	
Other (specify)	0	0.0%	0.0%	
Total:	20			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	1	25.0%	11.1%	
Intermediate Water (>20m, <100m)	2	50.0%	22.2%	
Shallow Water (<20m)	4	100.0%	44.4%	
Estuaries, Bays, Harbors	2	50.0%	22.2%	
Other (specify)	0	0.0%	0.0%	
Total:	9			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	0	0.0%	0.0%	
Daily	2	50.0%	50.0%	
Weekly	0	0.0%	0.0%	
Monthly	2	50.0%	50.0%	
Annually	0	0.0%	0.0%	
Intermittent	0	0.0%	0.0%	
Total:	4			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	2	50.0%		4.50
Computer Disk	4	100.0%		10.00
CD-ROM	2	50.0%		5.50
Nine-track (reel) Tape	2	50.0%		7.50
Tape Cartridge (e.g., DAT, QIC)	2	50.0%		8.50
Electronic Network	4	100.0%		9.25
Telephone - Fax	2	50.0%		3.50
Telephone - Electronic Voice	2	50.0%		2.50
Radio Broadcast	2	50.0%		1.00
Total:	22			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Coastal Engineering Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: COASTAL ENGINEERING (150 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
HIGHEST DEGREE OBTAINED			
High School/Other	3	2.0%	2.0%
B.S./B.A.	37	24.7%	24.8%
M.S./M.A.	66	44.0%	44.3%
Ph.D.	43	28.7%	28.9%
Total:	149		
PRIMARY FIELD OF WORK			
Science	40	26.7%	23.5%
Engineering	105	70.0%	61.8%
Construction/Operations	7	4.7%	4.1%
Planning	13	8.7%	7.6%
Management	2	1.3%	1.2%
Regulatory	3	2.0%	1.8%
Total:	170		
ORGANIZATIONAL AFFILIATION			
Corps of Engineers	88	58.7%	60.7%
Other Federal Government	5	3.3%	3.4%
State/Local Government	8	5.3%	5.5%
Private	16	10.7%	11.0%
University/Academia	27	18.0%	18.6%
Other (specify)	1	0.7%	0.7%
Total:	145		
APPLICATION(S) OF WAVE DATA AND PRODUCTS			
Coastal Engineering	150	100.0%	27.7%
Ocean/Offshore Engineering	34	22.7%	6.3%
Coastal Processes	114	76.0%	21.1%
Coastal Zone Management	41	27.3%	7.6%
Military Operations	11	7.3%	2.0%
Environmental (e.g., Water Quality)	46	30.7%	8.5%
Scientific Research	79	52.7%	14.6%
Forecasting	30	20.0%	5.5%
Maritime Operations	23	15.3%	4.3%
Other (specify)	13	8.7%	2.4%
Total:	541		
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED			
Individual Wave Record Time Series	86	57.3%	8.1%
Non-directional Wave Spectra	70	46.7%	6.6%
Directional Wave Spectra	90	60.0%	8.5%
Wave Parameters	124	82.7%	11.7%
Height	122	81.3%	11.5%

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: COASTAL ENGINEERING (150 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
Period	122	81.3%	11.5%
Direction	115	76.7%	10.8%
Still Water Level (mean depth during wave measurement)	75	50.0%	7.1%
Climatological Wave Statistics Based on Measured Data	83	55.3%	7.8%
Climatological Wave Statistics Based on Hindcasts	81	54.0%	7.6%
Summaries Showing When/Where Measured Data Available	79	52.7%	7.4%
Other (specify)	15	10.0%	1.4%
Total:	1062		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	54	36.0%	14.8%
Intermediate Water (>20m, <100m)	87	58.0%	23.8%
Shallow Water (<20m)	127	84.7%	34.8%
Estuaries, Bays, Harbors	89	59.3%	24.4%
Other (specify)	8	5.3%	2.2%
Total:	365		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	48	32.0%	20.2%
Daily	14	9.3%	5.9%
Weekly	5	3.3%	2.1%
Monthly	70	46.7%	29.4%
Annually	47	31.3%	19.7%
Intermittent	54	36.0%	22.7%
Total:	238		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	138	92.0%	5.96
Computer Disk	141	94.0%	8.42
CD-ROM	124	82.7%	6.63
Nine-track (reel) Tape	116	77.3%	3.08
Tape Cartridge (e.g., DAT, QIC)	117	78.0%	4.48
Electronic Network	133	88.7%	7.85
Telephone - Fax	116	77.3%	4.06
Telephone - Electronic Voice	111	74.0%	3.03
Radio Broadcast	111	74.0%	2.41
Total:	1107		

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Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Coastal Processes Respondents**



FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: COASTAL PROCESSES (138 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	POP. QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	1	0.7%	0.7%	
B.S./B.A.	31	22.5%	22.5%	
M.S./M.A.	56	40.6%	40.6%	
Ph.D.	50	36.2%	36.2%	
Total:	138			
PRIMARY FIELD OF WORK				
Science	49	35.5%	31.2%	
Engineering	83	60.1%	52.9%	
Construction/Operations	5	3.6%	3.2%	
Planning	12	8.7%	7.6%	
Management	5	3.6%	3.2%	
Regulatory	3	2.2%	1.9%	
Total:	157			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	73	52.9%	53.3%	
Other Federal Government	8	5.8%	5.8%	
State/Local Government	10	7.2%	7.3%	
Private	14	10.1%	10.2%	
University/Academia	31	22.5%	22.6%	
Other (specify)	1	0.7%	0.7%	
Total:	137			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	114	82.6%	21.4%	
Ocean/Offshore Engineering	31	22.5%	5.8%	
Coastal Processes	138	100.0%	25.9%	
Coastal Zone Management	45	32.6%	8.5%	
Military Operations	12	8.7%	2.3%	
Environmental (e.g., Water Quality)	51	37.0%	9.6%	
Scientific Research	83	60.1%	15.6%	
Forecasting	28	20.3%	5.3%	
Maritime Operations	21	15.2%	3.9%	
Other (specify)	9	6.5%	1.7%	
Total:	532			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	86	62.3%	8.5%	
Non-directional Wave Spectra	67	48.6%	6.6%	
Directional Wave Spectra	85	61.6%	8.4%	
Wave Parameters	118	85.5%	11.7%	
Height	116	84.1%	11.5%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: COASTAL PROCESSES (138 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	POP. QUES.	
Period	115	83.3%	11.4%	
Direction	108	78.3%	10.7%	
Still Water Level (mean depth during wave measurement)	73	52.9%	7.2%	
Climatological Wave Statistics Based on Measured Data	82	59.4%	8.1%	
Climatological Wave Statistics Based on Hindcasts	74	53.6%	7.3%	
Summaries Showing When/Where Measured Data Available	73	52.9%	7.2%	
Other (specify)	13	9.4%	1.3%	
Total:	1010			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	48	34.8%	14.2%	
Intermediate Water (>20m, <100m)	77	55.8%	22.8%	
Shallow Water (<20m)	118	85.5%	34.9%	
Estuaries, Bays, Harbors	88	63.8%	26.0%	
Other (specify)	7	5.1%	2.1%	
Total:	338			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	46	33.3%	20.2%	
Daily	16	11.6%	7.0%	
Weekly	6	4.3%	2.6%	
Monthly	67	48.6%	29.4%	
Annually	43	31.2%	18.9%	
Intermittent	50	36.2%	21.9%	
Total:	228			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	127	92.0%	5.60	
Computer Disk	133	96.4%	8.47	
CD-ROM	121	87.7%	6.60	
Nine-track (reel) Tape	111	80.4%	2.96	
Tape Cartridge (e.g., DAT, QIC)	114	82.6%	4.70	
Electronic Network	126	91.3%	7.75	
Telephone - Fax	111	80.4%	3.90	
Telephone - Electronic Voice	106	76.8%	2.98	
Radio Broadcast	106	76.8%	2.41	
Total:	1055			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Scientific Research Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: SCIENTIFIC RESEARCH (113 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% POP.	% QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	2	1.8%	1.8%	
B.S./B.A.	15	13.3%	13.5%	
M.S./M.A.	36	31.9%	32.4%	
Ph.D.	58	51.3%	52.3%	
Total:	111			
PRIMARY FIELD OF WORK				
Science	57	50.4%	44.5%	
Engineering	59	52.2%	46.1%	
Construction/Operations	2	1.8%	1.6%	
Planning	3	2.7%	2.3%	
Management	4	3.5%	3.1%	
Regulatory	3	2.7%	2.3%	
Total:	128			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	40	35.4%	35.7%	
Other Federal Government	14	12.4%	12.5%	
State/Local Government	8	7.1%	7.1%	
Private	14	12.4%	12.5%	
University/Academia	32	28.3%	28.6%	
Other (specify)	4	3.5%	3.6%	
Total:	112			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	79	69.9%	17.4%	
Ocean/Offshore Engineering	33	29.2%	7.3%	
Coastal Processes	83	73.5%	18.3%	
Coastal Zone Management	32	28.3%	7.1%	
Military Operations	13	11.5%	2.9%	
Environmental (e.g., Water Quality)	46	40.7%	10.2%	
Scientific Research	113	100.0%	24.9%	
Forecasting	28	24.8%	6.2%	
Maritime Operations	17	15.0%	3.8%	
Other (specify)	9	8.0%	2.0%	
Total:	453			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	72	63.7%	9.2%	
Non-directional Wave Spectra	59	52.2%	7.5%	
Directional Wave Spectra	71	62.8%	9.1%	
Wave Parameters	88	77.9%	11.2%	
Height	86	76.1%	11.0%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
--

Population: SCIENTIFIC RESEARCH (113 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
Period	84	74.3%	10.7%	
Direction	81	71.7%	10.3%	
Still Water Level (mean depth during wave measurement)	54	47.8%	6.9%	
Climatological Wave Statistics Based on Measured Data	73	64.6%	9.3%	
Climatological Wave Statistics Based on Hindcasts	52	46.0%	6.6%	
Summaries Showing When/Where Measured Data Available	54	47.8%	6.9%	
Other (specify)	10	8.8%	1.3%	
Total:	784			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	49	43.4%	17.7%	
Intermediate Water (>20m, <100m)	73	64.6%	26.4%	
Shallow Water (<20m)	88	77.9%	31.8%	
Estuaries, Bays, Harbors	62	54.9%	22.4%	
Other (specify)	5	4.4%	1.8%	
Total:	277			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	39	34.5%	21.2%	
Daily	13	11.5%	7.1%	
Weekly	5	4.4%	2.7%	
Monthly	49	43.4%	26.6%	
Annually	33	29.2%	17.9%	
Intermittent	45	39.8%	24.5%	
Total:	184			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	100	88.5%		5.09
Computer Disk	105	92.9%		8.08
CD-ROM	92	81.4%		6.93
Nine-track (reel) Tape	84	74.3%		3.56
Tape Cartridge (e.g., DAT, QIC)	90	79.6%		5.34
Electronic Network	99	87.6%		8.24
Telephone - Fax	84	74.3%		3.27
Telephone - Electronic Voice	80	70.8%		2.69
Radio Broadcast	80	70.8%		2.39
Total:	814			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Environmental Respondents**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: ENVIRONMENTAL (67 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
HIGHEST DEGREE OBTAINED				
High School/Other	2	3.0%	3.0%	
B.S./B.A.	10	14.9%	14.9%	
M.S./M.A.	31	46.3%	46.3%	
Ph.D.	24	35.8%	35.8%	
Total:	67			
PRIMARY FIELD OF WORK				
Science	26	38.8%	36.1%	
Engineering	34	50.7%	47.2%	
Construction/Operations	3	4.5%	4.2%	
Planning	3	4.5%	4.2%	
Management	5	7.5%	6.9%	
Regulatory	1	1.5%	1.4%	
Total:	72			
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	18	26.9%	26.9%	
Other Federal Government	8	11.9%	11.9%	
State/Local Government	8	11.9%	11.9%	
Private	12	17.9%	17.9%	
University/Academia	17	25.4%	25.4%	
Other (specify)	4	6.0%	6.0%	
Total:	67			
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	46	68.7%	14.6%	
Ocean/Offshore Engineering	21	31.3%	6.7%	
Coastal Processes	51	76.1%	16.2%	
Coastal Zone Management	34	50.7%	10.8%	
Military Operations	5	7.5%	1.6%	
Environmental (e.g., Water Quality)	67	100.0%	21.3%	
Scientific Research	46	68.7%	14.6%	
Forecasting	20	29.9%	6.4%	
Maritime Operations	19	28.4%	6.1%	
Other (specify)	5	7.5%	1.6%	
Total:	314			
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	45	67.2%	9.7%	
Non-directional Wave Spectra	34	50.7%	7.3%	
Directional Wave Spectra	38	56.7%	8.2%	
Wave Parameters	50	74.6%	10.8%	
Height	47	70.1%	10.2%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: ENVIRONMENTAL (67 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
Period	46	68.7%	9.9%	
Direction	42	62.7%	9.1%	
Still Water Level (mean depth during wave measurement)	37	55.2%	8.0%	
Climatological Wave Statistics Based on Measured Data	44	65.7%	9.5%	
Climatological Wave Statistics Based on Hindcasts	38	56.7%	8.2%	
Summaries Showing When/Where Measured Data Available	35	52.2%	7.6%	
Other (specify)	7	10.4%	1.5%	
Total:	463			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	26	38.8%	14.9%	
Intermediate Water (>20m, <100m)	45	67.2%	25.7%	
Shallow Water (<20m)	51	76.1%	29.1%	
Estuaries, Bays, Harbors	49	73.1%	28.0%	
Other (specify)	4	6.0%	2.3%	
Total:	175			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	25	37.3%	21.9%	
Daily	5	7.5%	4.4%	
Weekly	2	3.0%	1.8%	
Monthly	27	40.3%	23.7%	
Annually	21	31.3%	18.4%	
Intermittent	34	50.7%	29.8%	
Total:	114			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	62	92.5%		5.60
Computer Disk	62	92.5%		8.60
CD-ROM	57	85.1%		7.16
Nine-track (reel) Tape	54	80.6%		2.67
Tape Cartridge (e.g., DAT, QIC)	55	82.1%		4.16
Electronic Network	59	88.1%		7.73
Telephone - Fax	52	77.6%		4.25
Telephone - Electronic Voice	51	76.1%		3.59
Radio Broadcast	51	76.1%		3.14
Total:	503			

Survey Scanning and Analysis by Neptune Sciences, Inc.



## **Coastal Zone Management Respondents**

## **Ocean/Offshore Engineering Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: OCEAN/OFFSHORE ENGINEERING (46 responses)

Page: 1

SURVEY ITEM	RESPONSES		
	COUNT	% BASIS	AVG. VALUE
HIGHEST DEGREE OBTAINED			
High School/Other	0	0.0%	0.0%
B.S./B.A.	8	17.4%	17.0%
M.S./M.A.	15	32.6%	31.9%
Ph.D.	24	52.2%	51.1%
Total:	47		
PRIMARY FIELD OF WORK			
Science	18	39.1%	35.3%
Engineering	31	67.4%	60.8%
Construction/Operations	1	2.2%	2.0%
Planning	1	2.2%	2.0%
Management	0	0.0%	0.0%
Regulatory	0	0.0%	0.0%
Total:	51		
ORGANIZATIONAL AFFILIATION			
Corps of Engineers	10	21.7%	22.2%
Other Federal Government	8	17.4%	17.8%
State/Local Government	0	0.0%	0.0%
Private	15	32.6%	33.3%
University/Academia	11	23.9%	24.4%
Other (specify)	1	2.2%	2.2%
Total:	45		
APPLICATION(S) OF WAVE DATA AND PRODUCTS			
Coastal Engineering	34	73.9%	15.0%
Ocean/Offshore Engineering	46	100.0%	20.3%
Coastal Processes	31	67.4%	13.7%
Coastal Zone Management	12	26.1%	5.3%
Military Operations	10	21.7%	4.4%
Environmental (e.g., Water Quality)	21	45.7%	9.3%
Scientific Research	33	71.7%	14.5%
Forecasting	17	37.0%	7.5%
Maritime Operations	17	37.0%	7.5%
Other (specify)	6	13.0%	2.6%
Total:	227		
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED			
Individual Wave Record Time Series	30	65.2%	8.6%
Non-directional Wave Spectra	28	60.9%	8.0%
Directional Wave Spectra	31	67.4%	8.9%
Wave Parameters	39	84.8%	11.2%
Height	38	82.6%	10.9%

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: OCEAN/OFFSHORE ENGINEERING (46 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
Period	37	80.4%	10.6%
Direction	34	73.9%	9.8%
Still Water Level (mean depth during wave measurement)	23	50.0%	6.6%
Climatological Wave Statistics Based on Measured Data	32	69.6%	9.2%
Climatological Wave Statistics Based on Hindcasts	25	54.3%	7.2%
Summaries Showing When/Where Measured Data Available	24	52.2%	6.9%
Other (specify)	7	15.2%	2.0%
Total:	348		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	28	60.9%	25.7%
Intermediate Water (>20m, <100m)	31	67.4%	28.4%
Shallow Water (<20m)	32	69.6%	29.4%
Estuaries, Bays, Harbors	17	37.0%	15.6%
Other (specify)	1	2.2%	0.9%
Total:	109		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	14	30.4%	19.7%
Daily	4	8.7%	5.6%
Weekly	3	6.5%	4.2%
Monthly	19	41.3%	26.8%
Annually	11	23.9%	15.5%
Intermittent	20	43.5%	28.2%
Total:	71		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	41	89.1%	4.98
Computer Disk	42	91.3%	8.36
CD-ROM	38	82.6%	7.50
Nine-track (reel) Tape	33	71.7%	3.45
Tape Cartridge (e.g., DAT, QIC)	36	78.3%	4.86
Electronic Network	40	87.0%	7.98
Telephone - Fax	34	73.9%	3.88
Telephone - Electronic Voice	32	69.6%	3.41
Radio Broadcast	32	69.6%	2.88
Total:	328		

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Forecasting Respondents**

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: FORECASTING (46 responses)

Page: 1

SURVEY ITEM	RESPONSES		
	COUNT	% BASIS	AVG. VALUE
HIGHEST DEGREE OBTAINED			
High School/Other	0	0.0%	0.0%
B.S./B.A.	10	21.7%	23.3%
M.S./M.A.	17	37.0%	39.5%
Ph.D.	16	34.8%	37.2%
Total:	43		
PRIMARY FIELD OF WORK			
Science	18	39.1%	38.3%
Engineering	23	50.0%	48.9%
Construction/Operations	2	4.3%	4.3%
Planning	3	6.5%	6.4%
Management	1	2.2%	2.1%
Regulatory	0	0.0%	0.0%
Total:	47		
ORGANIZATIONAL AFFILIATION			
Corps of Engineers	16	34.8%	36.4%
Other Federal Government	10	21.7%	22.7%
State/Local Government	1	2.2%	2.3%
Private	10	21.7%	22.7%
University/Academia	5	10.9%	11.4%
Other (specify)	2	4.3%	4.5%
Total:	44		
APPLICATION(S) OF WAVE DATA AND PRODUCTS			
Coastal Engineering	30	65.2%	14.2%
Ocean/Offshore Engineering	17	37.0%	8.1%
Coastal Processes	28	60.9%	13.3%
Coastal Zone Management	14	30.4%	6.6%
Military Operations	10	21.7%	4.7%
Environmental (e.g., Water Quality)	20	43.5%	9.5%
Scientific Research	28	60.9%	13.3%
Forecasting	46	100.0%	21.8%
Maritime Operations	15	32.6%	7.1%
Other (specify)	3	6.5%	1.4%
Total:	211		
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED			
Individual Wave Record Time Series	28	60.9%	8.9%
Non-directional Wave Spectra	26	56.5%	8.3%
Directional Wave Spectra	28	60.9%	8.9%
Wave Parameters	36	78.3%	11.5%
Height	35	76.1%	11.2%

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: FORECASTING (46 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
Period	34	73.9%	10.9%	
Direction	31	67.4%	9.9%	
Still Water Level (mean depth during wave measurement)	19	41.3%	6.1%	
Climatological Wave Statistics Based on Measured Data	27	58.7%	8.6%	
Climatological Wave Statistics Based on Hindcasts	21	45.7%	6.7%	
Summaries Showing When/Where Measured Data Available	24	52.2%	7.7%	
Other (specify)	4	8.7%	1.3%	
Total:	313			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	28	60.9%	23.1%	
Intermediate Water (>20m, <100m)	32	69.6%	26.4%	
Shallow Water (<20m)	35	76.1%	28.9%	
Estuaries, Bays, Harbors	25	54.3%	20.7%	
Other (specify)	1	2.2%	0.8%	
Total:	121			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	22	47.8%	30.1%	
Daily	2	4.3%	2.7%	
Weekly	1	2.2%	1.4%	
Monthly	17	37.0%	23.3%	
Annually	11	23.9%	15.1%	
Intermittent	20	43.5%	27.4%	
Total:	73			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	40	87.0%		5.48
Computer Disk	41	89.1%		8.17
CD-ROM	39	84.8%		7.21
Nine-track (reel) Tape	37	80.4%		2.30
Tape Cartridge (e.g., DAT, QIC)	38	82.6%		3.92
Electronic Network	43	93.5%		8.35
Telephone - Fax	38	82.6%		4.32
Telephone - Electronic Voice	36	78.3%		2.97
Radio Broadcast	37	80.4%		2.73
Total:	349			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Maritime Operations Respondents**



## **Other Application Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: OTHER APPLICATION (23 responses)

Page: 1

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS	QUES.	
<hr/>				
HIGHEST DEGREE OBTAINED				
High School/Other	1	4.3%	4.3%	
B.S./B.A.	4	17.4%	17.4%	
M.S./M.A.	9	39.1%	39.1%	
Ph.D.	9	39.1%	39.1%	
	<hr/>			
Total:	23			
<hr/>				
PRIMARY FIELD OF WORK				
Science	7	30.4%	30.4%	
Engineering	14	60.9%	60.9%	
Construction/Operations	0	0.0%	0.0%	
Planning	0	0.0%	0.0%	
Management	1	4.3%	4.3%	
Regulatory	1	4.3%	4.3%	
	<hr/>			
Total:	23			
<hr/>				
ORGANIZATIONAL AFFILIATION				
Corps of Engineers	9	39.1%	39.1%	
Other Federal Government	2	8.7%	8.7%	
State/Local Government	0	0.0%	0.0%	
Private	5	21.7%	21.7%	
University/Academia	6	26.1%	26.1%	
Other (specify)	1	4.3%	4.3%	
	<hr/>			
Total:	23			
<hr/>				
APPLICATION(S) OF WAVE DATA AND PRODUCTS				
Coastal Engineering	13	56.5%	16.9%	
Ocean/Offshore Engineering	6	26.1%	7.8%	
Coastal Processes	9	39.1%	11.7%	
Coastal Zone Management	3	13.0%	3.9%	
Military Operations	2	8.7%	2.6%	
Environmental (e.g., Water Quality)	5	21.7%	6.5%	
Scientific Research	9	39.1%	11.7%	
Forecasting	3	13.0%	3.9%	
Maritime Operations	4	17.4%	5.2%	
Other (specify)	23	100.0%	29.9%	
	<hr/>			
Total:	77			
<hr/>				
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED				
Individual Wave Record Time Series	14	60.9%	9.9%	
Non-directional Wave Spectra	8	34.8%	5.6%	
Directional Wave Spectra	11	47.8%	7.7%	
Wave Parameters	16	69.6%	11.3%	
Height	14	60.9%	9.9%	

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY

Population: OTHER APPLICATION (23 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES		AVG. VALUE
		% BASIS POP.	QUES.	
Period	13	56.5%	9.2%	
Direction	14	60.9%	9.9%	
Still Water Level (mean depth during wave measurement)	7	30.4%	4.9%	
Climatological Wave Statistics Based on Measured Data	15	65.2%	10.6%	
Climatological Wave Statistics Based on Hindcasts	11	47.8%	7.7%	
Summaries Showing When/Where Measured Data Available	12	52.2%	8.5%	
Other (specify)	7	30.4%	4.9%	
Total:	142			
LOCATIONS OF NEEDED WAVE DATA				
Deep Water (>100m)	11	47.8%	20.4%	
Intermediate Water (>20m, <100m)	14	60.9%	25.9%	
Shallow Water (<20m)	17	73.9%	31.5%	
Estuaries, Bays, Harbors	9	39.1%	16.7%	
Other (specify)	3	13.0%	5.6%	
Total:	54			
PREFERRED SCHEDULE FOR PRODUCTS				
Near Real-time	6	26.1%	16.2%	
Daily	2	8.7%	5.4%	
Weekly	1	4.3%	2.7%	
Monthly	10	43.5%	27.0%	
Annually	7	30.4%	18.9%	
Intermittent	11	47.8%	29.7%	
Total:	37			
PREFERRED DELIVERY MEDIUM				
(1 = lowest preference, 10 = highest preference)				
Paper	19	82.6%		6.11
Computer Disk	17	73.9%		7.18
CD-ROM	16	69.6%		6.75
Nine-track (reel) Tape	16	69.6%		3.31
Tape Cartridge (e.g., DAT, QIC)	16	69.6%		3.69
Electronic Network	18	78.3%		7.94
Telephone - Fax	16	69.6%		6.06
Telephone - Electronic Voice	16	69.6%		3.56
Radio Broadcast	16	69.6%		3.38
Total:	150			

Survey Scanning and Analysis by Neptune Sciences, Inc.

## **Military Operations Respondents**

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
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Population: MILITARY OPERATIONS (19 responses)

Page: 1

SURVEY ITEM	RESPONSES		
	COUNT	% BASIS	AVG. VALUE
HIGHEST DEGREE OBTAINED			
High School/Other	0	0.0%	0.0%
B.S./B.A.	4	21.1%	22.2%
M.S./M.A.	6	31.6%	33.3%
Ph.D.	8	42.1%	44.4%
Total:	18		
PRIMARY FIELD OF WORK			
Science	6	31.6%	30.0%
Engineering	10	52.6%	50.0%
Construction/Operations	1	5.3%	5.0%
Planning	1	5.3%	5.0%
Management	2	10.5%	10.0%
Regulatory	0	0.0%	0.0%
Total:	20		
ORGANIZATIONAL AFFILIATION			
Corps of Engineers	9	47.4%	47.4%
Other Federal Government	6	31.6%	31.6%
State/Local Government	0	0.0%	0.0%
Private	3	15.8%	15.8%
University/Academia	0	0.0%	0.0%
Other (specify)	1	5.3%	5.3%
Total:	19		
APPLICATION(S) OF WAVE DATA AND PRODUCTS			
Coastal Engineering	11	57.9%	11.7%
Ocean/Offshore Engineering	10	52.6%	10.6%
Coastal Processes	12	63.2%	12.8%
Coastal Zone Management	3	15.8%	3.2%
Military Operations	19	100.0%	20.2%
Environmental (e.g., Water Quality)	5	26.3%	5.3%
Scientific Research	13	68.4%	13.8%
Forecasting	10	52.6%	10.6%
Maritime Operations	9	47.4%	9.6%
Other (specify)	2	10.5%	2.1%
Total:	94		
WAVE DATA AND PRODUCTS NOW OR RECENTLY USED			
Individual Wave Record Time Series	8	42.1%	6.3%
Non-directional Wave Spectra	8	42.1%	6.3%
Directional Wave Spectra	10	52.6%	7.8%
Wave Parameters	16	84.2%	12.5%
Height	16	84.2%	12.5%

Survey Scanning and Analysis by Neptune Sciences, Inc.

FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY
--

Population: MILITARY OPERATIONS (19 responses)

Page: 2

SURVEY ITEM	COUNT	RESPONSES	
		% BASIS	AVG. VALUE
Period	15	78.9%	11.7%
Direction	14	73.7%	10.9%
Still Water Level (mean depth during wave measurement)	6	31.6%	4.7%
Climatological Wave Statistics Based on Measured Data	13	68.4%	10.2%
Climatological Wave Statistics Based on Hindcasts	9	47.4%	7.0%
Summaries Showing When/Where Measured Data Available	9	47.4%	7.0%
Other (specify)	4	21.1%	3.1%
Total:	128		
LOCATIONS OF NEEDED WAVE DATA			
Deep Water (>100m)	12	63.2%	25.0%
Intermediate Water (>20m, <100m)	14	73.7%	29.2%
Shallow Water (<20m)	14	73.7%	29.2%
Estuaries, Bays, Harbors	8	42.1%	16.7%
Other (specify)	0	0.0%	0.0%
Total:	48		
PREFERRED SCHEDULE FOR PRODUCTS			
Near Real-time	4	21.1%	12.9%
Daily	2	10.5%	6.5%
Weekly	1	5.3%	3.2%
Monthly	10	52.6%	32.3%
Annually	6	31.6%	19.4%
Intermittent	8	42.1%	25.8%
Total:	31		
PREFERRED DELIVERY MEDIUM			
(1 = lowest preference, 10 = highest preference)			
Paper	16	84.2%	4.88
Computer Disk	17	89.5%	7.41
CD-ROM	15	78.9%	6.53
Nine-track (reel) Tape	14	73.7%	3.29
Tape Cartridge (e.g., DAT, QIC)	14	73.7%	4.93
Electronic Network	17	89.5%	7.94
Telephone - Fax	14	73.7%	3.64
Telephone - Electronic Voice	13	68.4%	3.08
Radio Broadcast	13	68.4%	3.08
Total:	133		

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# **Appendix D**

## **“Other” Responses**

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**FIELD WAVE GAGING PROGRAM  
WAVE DATA USERS' NEEDS SURVEY**

**ENTRIES FOR "OTHER (SPECIFY)" SELECTIONS TO QUESTIONS**

A few "Other" selections did not include an entry. During analysis, "Other" selections were used without modification even if the selection could be considered with another selection. The following entries are most useful for showing additional applications, products, and locations.

**ORGANIZATIONAL AFFILIATION**

- private consulting
- consultant
- non-profit
- National Data Buoy
- US Navy
- retired
- illegible

**APPLICATION(S) OF WAVE DATA AND PRODUCTS**

- oil spill response
- environmental assessment, oil spill response
- oil spill
- coastal flooding
- vessel traffic management
- design of structures
- platform design
- design
- dredging
- dredging/construction
- remote sensing
- education
- environmental monitoring for permitting purposes
- navigation
- wave data acquisition, not application
- reservoir design
- inland reservoirs, wind/wave analysis
- litigation
- rip rap sizing
- teaching



consulting, engineering  
model calibration  
database

#### WAVE DATA AND PRODUCTS NOW OR RECENTLY USED

exceedence frequency of annual max hs  
extreme wave predictions  
sea surface temperature and salinity  
less interest in surface-gravity waves, more interest in  
    frequencies below Brunt-Vaisala  
time series-surge hydrograph  
only as required to review district design doc.  
uv time series  
correlation among vicinity gauges  
... low energy & missing data (no measurement or hindcast/forecast)  
wind-related  
currents, winds  
combination of wave measurement data and wave hindcast data  
calibrate/verify numerical models  
WIS  
water level record (from wave gauge)

#### LOCATIONS OF NEEDED WAVE DATA

selected ports  
inner harbors  
reservoirs  
lakes  
inland lakes  
lakes and reservoirs  
Lake Okeechobee  
tidal inlets  
tidal Inlets  
greater than 10 m

# **Appendix E Response Comments and Suggestions**

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## FIELD WAVE GAGING PROGRAM WAVE DATA USERS' NEEDS SURVEY

### RECEIVED COMMENTS AND SUGGESTIONS

The following comments and suggestions were received. They are placed in relatively broad categories, but there is some overlap between the categories. For example, several comments and suggestions under "data and product distribution" also pertain to "data analysis and related data collection aspects". The categories and individual comments and suggestions are not prioritized, but comments that are general in nature tend to be in the "miscellaneous" category. The comments and suggestions were not edited except for minor spelling and grammar corrections. Illegible wording in a response is indicated by "...". Because many respondents seemed interested in feedback from the FWGP, comments and suggestions with respondent names (if provided with the returned survey) have been separately provided to the FWGP. Miscellaneous cover letters, thank you notes, and extracts from other information that were submitted have also been provided to the FWGP.

#### DATA ANALYSIS AND RELATED DATA COLLECTION ASPECTS

Mostly interested in long period (low frequency) wave energies. From my experiences with PULA/POLB, I've found 2+ hour records to be best compromise (usually 8192 seconds +1020 seconds for filtering purposes). I know this is not the standard wave product and there are questions of record stationarity. As an example, the POLB study I'm doing now used some platform Edith data. If I'm not mistaken data are now collected hourly for 2048 seconds. I used some of these Edith time series but would have preferred continuous time series (sampled at ... 2 second intervals). This would actually result in fewer data (1800 vs 2048 per hour) and allow accurate filtering out of tidal energies (two pass sine Butterworth filter with low pole count). Anyway, my basic thought was to have the ability to quickly change (remotely?) the mode of data acquisition of our/other gages from short to long periods (or visa versa) as the situation/study warrants.

My experience is largely with using the monthly data furnished by the National Data Buoy Center. As regarding their data, it would be desirable for them to: 1. furnish estimate of errors in their reported data, 2. improve their spectral capability to measure wave curvatures.

Data as indicated on Deed's Survey is critical to the works of marine surveyors in coordinating accident and damage investigations.

See my paper in the December Issue of The Journal of Ship Research. If you wish a reprint, call my secretary at (telephone number has been provided to the FWGP). There is an error in the paper (but the major results are still correct). The interpretation of all wave measuring systems and the analysis of the data therefore need to be completely recalculated on the basis of these results.

What we have used is indicated on the form. If available we will use directional spectra.

It is important to know how this "data" is collected so that the user can use some judgment in determining what might be bad data. In other words, it shouldn't be a "black-box process" in which there are all these magical statistics/numbers that appear in a table with no idea of how they were calculated or tabulated. There are many problems in trying to collect "coastal data" and the user of this data needs to be aware of the risk and/or error that is associated with using it and collecting it.

Data products and statistics should be done in such a way that the user knows exactly how it is done, which assumptions are made and what formulations were used. Also the statistics provided should be revealing and not just be done for the sake of providing some numbers. Climatological and seasonal distributions both in tabular and graphical form are helpful. Also an indication of the quality of the data is helpful. In other words, if 50% of the data is rejected at a station then the sensor may not be trustworthy. Such data should be summarized in annual reports and made available on a monthly basis via anonymous ftp.

#### DATA AND PRODUCT DISTRIBUTION (INCLUDING DATABASE COMMENTS)

Another idea for the delivery medium could be setting up a BBS line that users with the correct password could access and download and/or view the info. they needed. Your database could be a very broad relational database such that when a user chose a file that he wanted to view, it would associate all the correct plotting/viewing info. and pop up the plot on-screen. The user could then download the info. if needed or print it out. The database should probably also contain GIS incorporated with it so that a person could see geographical changes in historical sequence.

Recommend a report be available of a less technical nature that gives overview of wave gaging technology and analysis, describes types of products, constraints, adv./disadv., siting/deployment options and considerations, selection of sampling parameters i.e. things you need to know when you are considering establishment of a wave gage and what questions you need to ask.

Should maximize consistency in format/content of measured wave data and hindcast data. Should be more coordination between ACES 2.0 development, CEDRS development, and development of measured wave data database. Doesn't seem to be much coordination between CEDRS and wave data base holders/overseers. How do we get there? Need to make measured data more accessible to users (in-CERC and outside of CERC) in way that minimizes effort required of PMAB staff. I don't believe real potential of the measured data are being tapped at all because of the difficulty in getting to the data. Thanks for opportunity to comment! Would love to be able to retrieve Ocean City wave data over the network by logging into database system that is menu-driven and allows me to select data and retrieve it in a format that our models and support software recognize and can ingest.

Coastal engineers traditionally use wave data to 1. develop sediment transport models and budgets and to 2. develop design wave characteristics for design of coastal structures. For sediment models, the user needs the directional wave data broken down into directional, energy level bins. And, the percentage of yearly hours the waves are statistically found in these bins. In practice, the directional wave data must then be rotated in orientation so that it will match the outer boundary of a numerical, wave transformation model. It is therefore suggested that standard software be developed for this purpose so that for a given site and CERC wave data (e.g. Virginia Beach), the directional wave data can be readily organized into statistical bins, with rotated direction and in a format for ready application to CERC's wave transformation (RCPWAVE, SHALWV) and coastal processes models (GENESIS). Data in this format will also be useful for design purposes. Wave data products at CERC need to be used at the local district office level whenever and wherever applicable. A concerted effort is needed to educate key D.O. personnel in the Planning and the Engineering Divisions about the wave data available and about summary analysis reports. For example, the Norfolk D.O. continues to turn out feasibility, planning and engineering reports about Virginia Beach and Sandbridge in 1994 with no mention of actual wave data statistics at the VBWG that have been measured since 1990.

As a suggestion, it would be useful to develop an FWGP database that can be quickly accessed by PC or MAC users using Internet.

Please archive the original record, together with quality control information. Our needs and analysis may change with technical evolution.

Use COASTNET for announcements of data availability, etc. It may also be helpful to keep records on who is using the wave data and the associated publications. The wave data users could then be made aware of this usage via COASTNET, Internet, newsletter, annual publication, etc.

Need application software and/or data for use on personal computers (if not already available).

FWGP should seek to provide a consolidated service, i.e. CDIP, FCDN, NDBC etc. Consolidated service should be available electronically. Service should seek to provide, as a minimum, the products available from CDIP. However, additional products are needed particularly graphics/plotting/visualization capabilities.

We use buoy data primarily as input into numerical hindcasts and predictions of waves and wave-induced sediment transport. Products we are likely to use include hourly spectra, hourly statistics (Hs, T, wind speed and direction, etc.) and monthly, annual, and long-term wave climatological data. For our uses, long records are vital and a long record from a single location is generally more valuable (to us) than short records from more sites. Network access to wave data is most preferable, and is practical for individuals and small operations. Dial-up access to Internet sites is available across the country, and the hardware/software required to maintain a network site is within even the smallest budgets. We recommend that WES and/or the Washington State Department of Ecology either maintain or rent space on an Internet host and archive data there for downloading by users. Finally, we applaud the maintenance of long-term monitoring by WES and the Washington State Department of Ecology and would like to support the efforts. We can offer assistance in developing data reduction methods and maintenance of hardware near the Battelle Marine Sciences Lab. The contact is (name and address have been provided to the FWGP).

The data collection sites in Alaska are now using a PC with modem to record and pre-process wave data from Datawell Buoys. This data can be looked at and used at any time. Should consider all data collection sites. Use a PC with modem or Internet, then designers and others can look at it whenever they need to.

I think remote retrieval via Internet would be the best way for researchers to access the data. An alternative will be required for those who do not have access. My delivery format preferences reflect the hardware that I have available to me. If I had a CD-ROM drive, that would be my number 2 choice (after Internet). I think it is important to have both computed parameters/spectra and raw data available to users. I just received a box of diskettes containing compressed hindcast data (WIS hindcast). Is it worthwhile to consider a unified strategy for making the data (both hindcast and measured) available to users?

The National Climatic Data Center archives and maintains global marine data collected from ships and drifting/moored buoys, and provides marine and spectral ocean wave model data and statistical products to all levels of needs. NCDC's Global Analysis Branch is currently compiling the historical Buoy and C-MAN data provided by NDBC and archived at NCDC and plan to produce by early 1995 a CD-ROM containing both the hourly data and statistical tables of all marine elements available (i.e. air and sea temperature, average and gust winds, waves, and sea level pressure). It is important to be able to distinguish information between the four wave gaging networks because we already archive the NDBC data.

Including the FRF data collection program in this planned data base would be helpful. I use their data more than any of the other sets.

Data access via electronic network should be given high priority; second would be programs to extract data using interfaces for personal computers. A system like that implemented at the Center for Coastal Studies, SIO, allows access to users over the network using Mosaic, a free program that runs on Macintosh, IBM compatible and Unix platforms. Call (name and telephone number have been provided to the FWGP).

There are a number of problems that I have encountered with trying to obtain and utilize CERC collected data in the past (as recently as 1992). 1. Delay time between acquisition and availability is excessive (order of months to years after data is collected). 2. Data formats are often too abbreviated. 3. Individual time series data has never been provided when requested, even when working on Corps projects. 4. Have found major errors in codes used to convert data to online files (i.e. rollover errors). 5. Have found communication pathways awkward or highly inaccessible. Conversely, NOAA has excellent accessibility in almost any format.

To explain our survey answers: We would want near real-time access to buoys on our coast. We already have that. We would like access to monthly time series data for use in numerical models (Cray). We would like to receive monthly statistical summaries on paper. Access to historic annual time series data would also be required. Climatic summaries are preferred on paper, time series data is preferred on electronic medium in a format that could easily be read into a program written in FORTRAN or C.

A very useful product would be an annual report covering every gauge that was operational during the course of the year; these eventually might be supplemented by a summary report covering gauges that were operational for at least one year during the period prior to the inauguration of annual reports. It would probably be best if each network had its own reports, but with a common format. Reports would begin with a station directory including station name, coordinates, water depth, gauge type, availability, data products, etc. The report should also

indicate the media on which products are available and procedures for ordering data. The station directory would be followed (or footnoted) by a network activity log. A joint probability distribution table for the year would then be printed for each gauge on the network, based on spectral analysis (Hmo and Tp). One option might be to also provide a joint probability distribution based on zero-crossing analysis (Hs and Tz). Please include my name and address on your mailing list for survey results and other network information. Thanks for this opportunity to provide input. (Additional example tables with this response have been provided to the FWGP.)

Near real-time only after an event for during an event.

1. Most important is quality control.
2. Access in usable formats
3. Timeliness
4. Concentrate on visibility and wider distribution.
5. I am glad that there will finally be some published standards for data reduction.
6. A long term database is invaluable. Storm and site specific data can be valuable in settling contract claims involving weather delays or in litigation on project performance.
7. I like the idea of archiving data on CD-ROM since it looks like everyone will have this media soon enough. I suggest storing data in a formatted ASCII type file (like how NDBC archives data) and let users figure out how to use data, or tap into a commercially available database program for storage, access and reporting. Please do not try to develop your own custom code like the LEO program.

Eventually, it might be helpful to have wave gauge data given in a CD-ROM format, but currently our branch doesn't have easy access to a CD-ROM drive. That will probably change in the future. Until then, providing data on a floppy disk is the preferred method and is helpful for any computer analysis that we do.

#### MEASUREMENTS (INCLUDING LOCATIONS AND CHARACTERISTICS)

We presently have several PUV gages located in study areas in support of feasibility studies. These gages have been placed by contractor. The State of NJ (non-Fed sponsor) may have an interest in continuing the deployment of these gages via the wave gaging program. How should I proceed? Are you only interested in DWG's?

Please include me (with ... address) on your mailing list. The FWGP has unlimited potential for application at JAX District.



As study manager for Broward, Brevard and Boca de Cangrejos (Puerto Rico), I would like to see more gages deployed in these areas. As a local Jacksonville surfer, I would like to see the NOAA gage replaced off of Mayport!

Since deep water data is relatively abundant there should be more emphasis on shallow water especially since most coastal structures are in shallow water.

If you recall, I have been working with (name has been provided to the FWGP) of South Carolina Sea Grant on establishing a multi-user directional wave gage off Folly Beach. Please provide me results of your survey of those responding from South Carolina. Thanks.

I prefer more frequent information (daily) when storms occur in areas of interest. Shallow water information and information for estuaries, bays and harbors would be necessary for particular areas where projects are on going. The type of data required would also be dependent upon project needs.

One of the greatest needs in areas such as southern California is for directional wave data when there are waves from two or more storm areas that arrive at the coast at the same time. This is nearly impossible to handle with present wave arrays. The use of wave arrays and wave hindcasting together helps.

In response to the above mentioned survey be advised that I am unable to respond because I am unfamiliar with many of the terms and their use. To my knowledge, Grays Harbor County does not have tide gauges which are accessible to my office such as Pacific County does. We are interested in the wave information, though, because it is extremely helpful to our emergency management agency during storms, etc. The information is used during events which may be influenced by high tides or high wave activity and could result in beach erosion and/or flooding. It is imperative that we have adverse weather information because of our responsibility of alert and warning to jurisdictions that may be affected. It is also used for navigational purposes. Therefore, although I am unable to complete your survey, it is the desire of this agency to receive information as you see fit.

As the vessel traffic controllers for the Puget Sound area, the use of timely, real-time wave height/direction information would be of significant value to the mariners we serve. The present source of this information now comes only from our VTS participants. Waverider buoys placed at the western entrance to the Strait of Juan de Fuca and in the eastern SJDF near buoy "RA" could provide valuable information. If wave information could be electronically shared real-time

with VTS, we could assist mariners in voyage planning and provide timely and accurate advisory information thereby enhancing waterways safety.

Enhancements of present data distribution would benefit me and other coastal engineers in Puget Sound. (1) The Yeomalt Point buoy should report Hs and Tp at 1/2-hr (at least) intervals during times when Hs is greater than 80 cm, in order to better define the time and intensity of the event and its duration. (2) A call-up mechanism to check on measured waves would be very helpful to "track" the growth of storms and make decisions about visually monitoring projects in near real-time. A few more buoys in locations having different exposures than Yeomalt Point would be very helpful in refining design conditions around the Sound.

Products of most interest are historical wave data to be used in designing breakwaters, fender systems, moorage locations, etc. for new port facilities in central Puget Sound.

The near real-time data from Grays Harbor has been very useful in forecasting not only swell height and period along the Washington coast, but also the bar conditions at the entrance to Grays Harbor. The high values recorded in Dec 1993 correlated well with the major beach erosion which occurred. If you are looking for more places to put buoys, additional sites along the coast would always be welcomed. Also, the Strait of Juan de Fuca needs to be instrumented with a wave-meter.

We mainly receive the data from Scripps via NWS AFOS computer/communications system input at Weather Service Office, San Diego. We receive real-time data from the Grays Harbor Buoy by phone con. with (name has been provided to the FWGP). Height, period and direction data are all important inputs for our coastal wave forecasts and Bar (Grays Harbor and Columbia R.) forecasts. We also furnish this info. to surfers -- probably averaging about 5 phone calls/day. I have been surprised that the wave heights reported in Puget Sound (Yeomalt Pt.) have been so low. We broadcast these on our Seattle Area NOAA weather radio continuous broadcasts. Suggestions: I'd prefer directions given in the NWS AFOS Product were from rather than toward. Wave data from the Strait of Juan de Fuca, particularly near the central part, would be very useful to us. Since the weather radio broadcast heard in the Grays Harbor Area is produced by Weather Service Office, Astoria, OR, I suggest you send a questionnaire to them (name and address have been provided to the FWGP). We really appreciate your efforts and Scripps' in providing this important data.

Our work is in Africa and the Middle East. Consequently limited wave data exists. Our needs for these data are not frequent and we rely solely on published data.

Wave data in the nearshore and bay areas along the Gulf of Mexico Coast is almost non-existent. This type of data is especially useful to the N.O. District C.O.E. to design hurricane and other flood protection devices and also to analyze marsh loss and how to rebuild it.

What I really need is good quality wave surface elevation records, during storms, at three locations for waves propagating onshore: 1. far outside the breaker zone, 2. just outside the breaker zone, and 3. within the breaker zone. From these, I would like to develop the probability distribution function for wave heights and crest heights.

Would prefer that some data be collected in deep, intermediate, and shallow water at the same "location" and time (for computer model calibration, verification) Please vary locations. Measurement times? Work to 3-month season.

APPLICATIONS (COMMENT IS UNDER MEASUREMENTS IF LOCATION EMPHASIZED)

At USCG R&D Center, we test boats and ships at various locations in the U.S. We run calm water trials first, and then seek high sea states for structural testing with strain gauges and accelerometers. We need both forecast and hindsight data on wave height and directional wave spectra. Usually, we collect this data on our own systems (free-floating wave buoy) but there are times when it becomes difficult to launch and retrieve the buoy from a small boat. We therefore are in need of your data to give us alternative and supportive data.

I have only used this wave data on one or two occasions and then obtained it from the Seattle District USACE. With more and more intensive management of coastal resources being required, I think that the kind of wave data provided by your system is proving to be priceless.

Focus on the needs of practicing engineers. To heck with the academics and their abstruse, irrelevant research.

Please continue to do research on inland reservoirs (narrow fetch) under both shallow v deep water conditions. Products needed include updates or expansions of topics presented in ETL1110-2-305 and EM1110-2-1414. Of particular interest is using wind data collected at 10 meters to forecast wave parameters meeting various configurations of structures and shorelines. Nomographs are particularly helpful.

During storm events, there is a need for real-time (or very close to real-time) wave and SWL data for emergency operations site reps.

In the Vicksburg District, we have limited need for wave data. Our only use would be for freeboard design on large dams.

Up to the present, my main interest in wave data has been as a forcing function for driving mixing within the upper ocean. I have developing interests in wave-driven transport processes. The quantity of interest for these applications is the Stokes drift profile which I derive from the directional and nondirectional spectra.

I have indicated on the attached form what my interests in the wave gaging program are. However, at this time I have not made use of the available information. I have a research program for two years for which it may be useful to have some FWGP data. I would appreciate a list of the available products, particularly for the South Florida area (name and address have been provided to the FWGP). Increased awareness of available information and the mechanisms for obtaining the data would be very useful. Thanks for the effort to solicit opinions.

Would like to have access to near real-time data intermittently for ... purposes like oceanography uses. This would be most useful in conditions with near real-time winds.

Water current data coincident with wave data in shallow coastal realm would be very helpful for material transport studies. NDBC is preparing a line of sight buoy (operates through a C-MAN station) buoy with these capabilities.

### MISCELLANEOUS

Need to establish inter-agency coordination for using this data.

What influence will the 55% "contracts" talk have on your operations next year? If there is a "hit list" I would like to know about it if possible.

Variety of structural project areas -- particularly breakwaters in nearshore along western and eastern portions of the state. Interested in knowing what's going on -- or if other agencies want

to possibly do a cost share. Am also interested in costs for installation and maintenance of directional wave information. I know it's not cheap, but want to keep up with costs over time.

(name has been provided to the FWGP) is a wave buoy manufacturer and as such our needs relate to truthing the performance of our products. Other applications include the incorporation of existing wave gauges and or buoys by others into our real-time data acquisition system and may develop a need for the data products, which is why I have indicated a selection under electronic networks.

I did not fill out the back page because I don't use wave data directly.

Since any data requested from PMAB is either not available, too costly, or cannot be used freely for publications, we have abstained using info. from this program. And also, we really have no idea what this program does, what type of data it has, and where measurements, past and present, are made. I think, as the program coordinator, you need to make us (the researchers, scientists) aware of what is out there and how we can get the data to use for our purposes. How about a twice a year seminar to all CERC employees to tell us what is available /done/new/old.

For our harmful phytoplankton dynamic project we need sea surface temperature (and salinity if possible). We are using satellite data, but coverage is poor due to cloud cover. Wave data is of minor or no interest unless someone develops algorithms that relate them to water circulation and temperature of the water.

It seems like a lot of bucks going to programs where the need is intermittent. For instance the location at West Point near Seattle, WA seems kind of silly. How much salary is dumped into this program annually?. As opposed to propping up programs for the benefit of supporting someone's government job how about dumping the money into programs that directly serve public interests. If the fishing industry or large shipping interests want a wave gauge at a particular location, let a local port authority pay for it (i.e. Port of Seattle, Port of Gray's Harbor) This should not be a Federal program. Let the Feds. set the standards. Let the users of the data pay for it.

Excellent idea for a needs survey. In reference to TR CERC 91-8, Field Wave Gaging: Five-plan Deployment Plan, FY 90-94. Have we obtained the data sets of nearshore wave conditions that we programmed for? Perhaps a regional workshop with Coastal Divisions is in order to see if data needs are changing.

**REPORT DOCUMENTATION PAGE**Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

<b>1. AGENCY USE ONLY (Leave blank)</b>		<b>2. REPORT DATE</b> August 1995	<b>3. REPORT TYPE AND DATES COVERED</b> Final report	
<b>4. TITLE AND SUBTITLE</b> Field Wave Gaging Program Wave Data User's Needs Survey			<b>5. FUNDING NUMBERS</b>	
<b>6. AUTHOR(S)</b> Neptune Sciences, Inc.				
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> 150 Cleveland Avenue, Slidell, LA 70458  11341 Sunset Hills Road, Reston, VA 22090			<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> U.S. Army Corps of Engineers Washington, DC 20314-1000  U.S. Army Engineer Waterways Experiment Station 3909 Halls Ferry Road Vicksburg, MS 39180-6199			<b>10. SPONSORING/MONITORING AGENCY REPORT NUMBER</b>  Contract Report CERC-95-1	
<b>11. SUPPLEMENTARY NOTES</b> Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.				
<b>12a. DISTRIBUTION/AVAILABILITY STATEMENT</b> Approved for public release; distribution is unlimited.			<b>12b. DISTRIBUTION CODE</b>	
<b>13. ABSTRACT (Maximum 200 words)</b> <p>A Wave Data User's Needs Survey was performed to support the U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center's (CERC) Field Wave Gaging Program (FWGP). Survey results will contribute to design of the data management and distribution system through which FWGP data and products will become available. Approximately 510 surveys were distributed to a wide variety of possible wave information users including contacts within Corps of Engineers Division and District offices, CERC personnel, and contacts outside the Corps of Engineers. The number of returned surveys totalled 212 resulting in an approximate 42-percent return rate. Responses were optically scanned and survey data were placed into a database. Statistical analysis provided quantitative results for a variety of response categories including (a) FWGP data and product users within the Corps of Engineers but not within CERC, (b) users within CERC, and (c) users outside of the Corps of Engineers. Results are provided as graphical presentations and as detailed tabulated reports.</p>				
<b>14. SUBJECT TERMS</b> Field Wave Gaging Program (FWGP)      Wave information Wave data      Wave measurements Wave data uses      Wave users survey			<b>15. NUMBER OF PAGES</b> 196	
			<b>16. PRICE CODE</b>	
<b>17. SECURITY CLASSIFICATION OF REPORT</b> UNCLASSIFIED	<b>18. SECURITY CLASSIFICATION OF THIS PAGE</b> UNCLASSIFIED	<b>19. SECURITY CLASSIFICATION OF ABSTRACT</b>	<b>20. LIMITATION OF ABSTRACT</b>	